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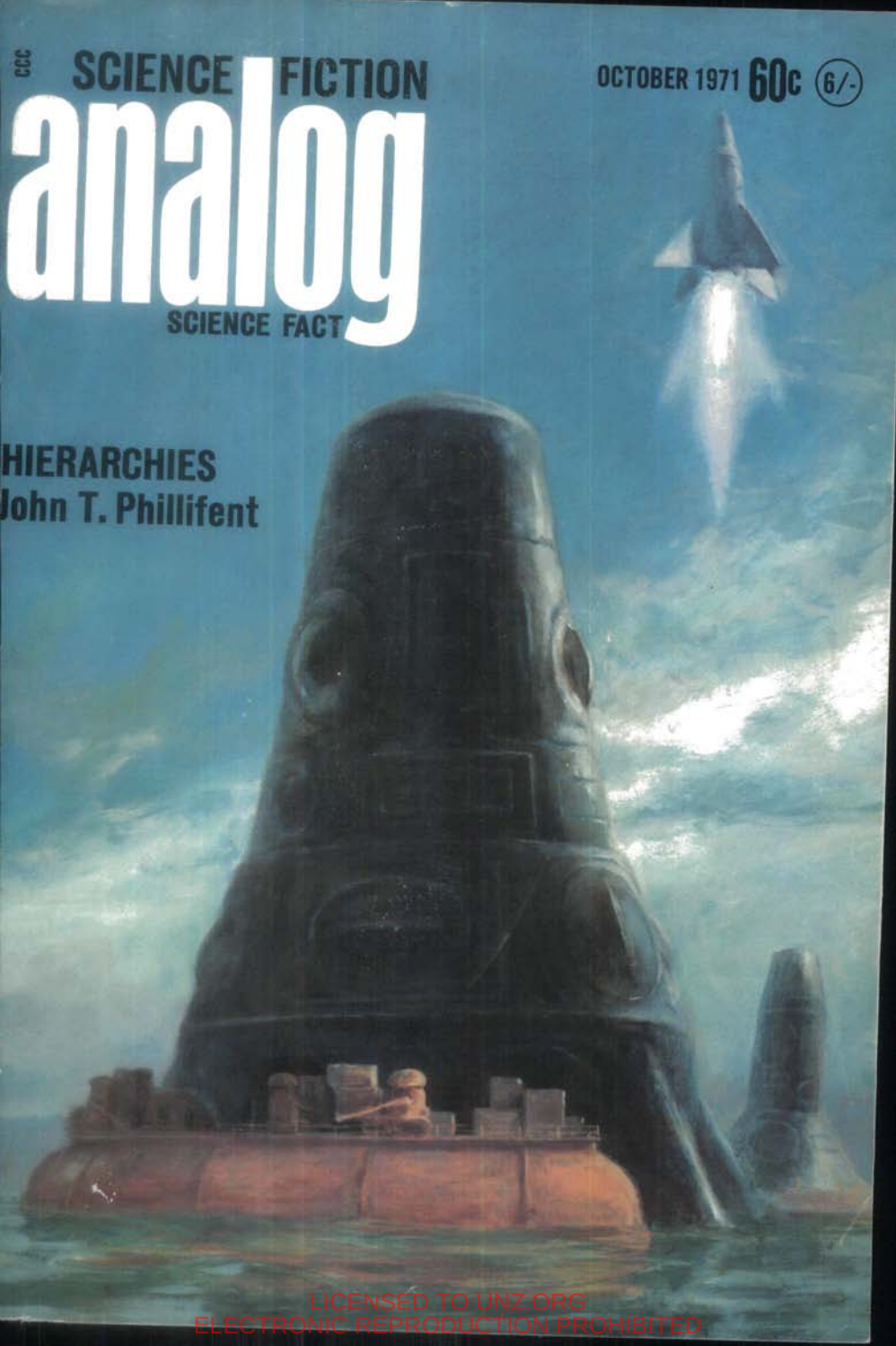

HIERARCHIES
John T. Phillifent

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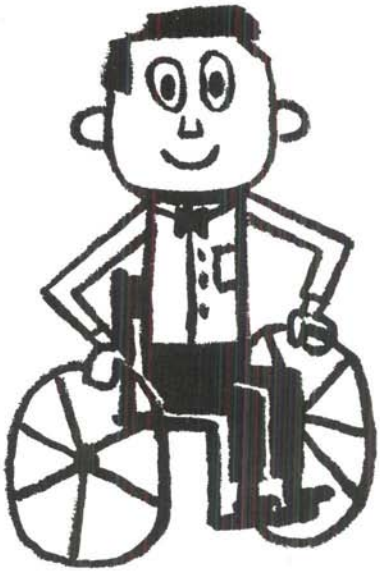

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JOHN WOOD CAMPBELL
1910-1971

John Wood Campbell, for thirty-four years the editor of this magazine, was an outstanding influence and leader in the development of modern science fiction. As he shaped and guided the growth of Analog into the respected and unique publication it has become, he shaped and guided as well the techniques of science-fiction writing and of many of the field's ablest authors.

Graduated from Duke University with a Bachelor of Science degree in physics, John Campbell became one of the most popular and memorable writers of science fiction, practicing with utmost distinction the craft he fought, edited, prodded, taught, and praised others into practicing with growing skill.

He will be remembered as an innovator, as an exciting writer, as a demanding editor. He will be remembered best by the uncounted people with whom he worked for the generosity of spirit with which he shared his energy, his ideas, his unstinted friendship, and his great gifts of creative judgment.

John Campbell always thought to the future. He wrote to the future. We are grateful that he left three of his provocative editorials for this and the following issues of Analog.

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Antipollution Device

an editorial
by John W Campbell

That I don't hold a high opinion of some of the massive campaigns being launched by Instant Ecology Experts is fairly clear, I think. So that must mean I don't think anything should be done, maybe?

No—but it does mean I'm against doing useless things at great expense, or doing things that in fact make the situation worse, in the glorious name of improving the situation. Like getting rid of lead in gasoline—at the expense of introducing a new source of powerfully carcinogenic substances in automobile exhaust. It's not that I like the danger of lead poisoning—it's just that I prefer a little lead poisoning—which can be treated effectively—to the danger of cancer-causing substances which cause something we can't treat effectively. Sort of "Which do you prefer, a broken leg or being attacked by ants?"

There are things that could be done—things that need to be done, and do not represent hysterical or political antipollution problems.

Most studies have pretty well agreed that the internal combustion engine is the source of most of the most dangerous pollution in the air. Most of the surveys and studies indicate that sixty percent of air pollution traces to internal combustion engines—cars, trucks, diesel locomotives, road-building machinery, et cetera.

The pollution they produce is real, massive, and seems to be politically untouchable. Most of the hysterical antipollution Instant Experts so dearly love their personal wheels that they forgive their dear beasts any nasty stink they may produce.

Practically every voting American citizen has his own set of wheels—including the Welfare recipients.

This massive body of voters makes the automotive pollution generator effectively a political untouchable.

Here's a magnificent case of a real, massive, dangerous pollution generator that not even the most fanatical Instant Expert Ecologist groups has dared to attack, and attack head-on. It's *real* pollution, not hysterical or political—and they walk around it carefully avoiding serious attacks.

Power plants are favorite attack-points. They're Big Corporation properties and therefore, obvious, automatic fair game for everyone with any grudges.

But the fact is that fossil-fuel plants give off relatively harmless fumes; combustion in their furnaces

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is just as complete as it can be and carried out with an excess of air, and relatively slowly (not millisecond explosive combustion as in internal combustion engines) so that the combustion products are almost completely in equlibrium--CO_2, N_2, H_2O, some SO_2 and a little CO.

Every one of those compounds is a naturally-present molecular species; you yourself breathe out CO_2, N_2, H_2O, a little SO_2 and even a little CO. The ecosystem of Earth adapted to those substances aeons ago. Carbon dioxide is the mainstay of all green plant "diets"; recent studies show that many soil bacteria and fungi are able to metabolize carbon monoxide quite happily. (One variety of the penicillium family likes the stuff!)

For ages, volcanoes have been exhaling stupendous tonnages of those substances--a little SO_2 in the air has even been shown to be actively beneficial to animals. (Remember that one of the favorite cross-linkage mechanisms in proteins depends on a sulfur linkage.)

Automobile exhaust, on the other hand, contains decidedly unnatural compounds--things not found in nature, because they're highly unstable products of partial oxidation. When hydrocarbon fuels are forced to burn in a too-limited supply of air, at high temperatures, in thousandths of a second, and are then swept out of the combustion region and cooled very rapidly--against chilled metal walls--substances come out that could not be produced in nature except in a lightning bolt. There, too, substances are heated to enormous temperatures in an exceedingly short time, and then abruptly cooled as the heat-source is withdrawn.

The IC engines--diesel or gas-operated--produce nitrogen oxides, just as lightning flashes do--but not in the middle of a rainstorm at high altitude, where they're diluted and washed away to enrich the soil or waters below. Even in great dilution, nitric oxides are *poisonous.* Hydrogen cyanide gas is deadly at 5 parts per million in air; nitrogen oxides are about one fifth as poisonous--25 ppm--as that favorite killer of detective-story fame.

The partially burned hydrocarbons are bad--and they get worse when the sun and air goes to work on them; the complex organic substances tend to be far more toxic than inorganic poisons, and a combination of solar ultraviolet, partially oxidized hydrocarbons, nitrogen oxides, atmospheric oxygen and nitrogen, a little ozone and who-knows-what odd other things--like lead bromide, for instance--combine to produce "photochemical smog."

Those compounds are not things Earth's life forms have grown up with for the last billion or so years.

So how can we attack the untouchable problem of mobile smog-generators?

A fundamental aspect is that (1) manufacturers won't make a product

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people don't want, and (2) will strive to continue to produce a product people do like.

There's no production electric vehicle available in America today except golf carts that the public could buy if they wanted to. Manufacturers don't produce something for which there's no demand.

Electric cars that we could manufacture today would have a maximum range-between-charges of about 75 to 100 miles, would be small, relatively light-bodied, would have a maximum speed of about 60 miles an hour, and definitely would *not* give zero-to-60 in 6 seconds performance. They'd be *low* horsepower and, therefore, acceleration would be moderate. No rubber-burning jackrabbit starts!

They would, however, make ideal commuter and in-city transportation; they'd be perfect for the housewife's shopping and social calls.

They would be, that is, if she could buy one, which she can't.

And they produce *no* pollution. The nuclear power reactors that fueled them with electricity via the power lines would produce no pollution in the biosphere.* The service life would be many years, reducing the scrap-automobile problem.

The major reasons the electrics are unwanted in the market—and, therefore, not manufactured for sale—are that the public (1) is unfamiliar with what they can do, (2) is accustomed to high performance, high horsepower, large size and (3) holds the big, long, low *varooom* type car as a High Status Symbol.

Some sweet day we may have really good energy storage devices; as of now batteries simply aren't capable of supplying the 400 kilowatt power surges required to match top-performance internal combustion—IC—engines. They can not supply 80-mile-per-hour speed to a three-ton automobile for four hours continuously without recharge, as a gasoline tank can.

On the other hand, electrics are *intrinsically* nonpolluting; their exhaust emissions simply don't exist, and, therefore, do not have to be cleaned up. While IC engines are, by their inherent characteristics, extremely dangerous polluters.

That difference is relevant, important, and crucial—whatever "in" terms may currently be accepted as meaning "Something's got to be done, and soon!"

It's been demonstrated—in that low-pollution car race a year or so ago—that extremely low-pollution emissions *can* be achieved with standard piston engines. That laboratory experiment type operation, however, neglected to make clear the two most important factors; such cars have to employ some $800 to $1200 worth of platinum-metal catalytic exhaust

continued on page 174

* And if you insist on "thermal pollution" being a problem, remember that because big power plants are far more efficient than automotive engines, the net thermal outpouring of a power plant would be far less than that of all the IC automobiles the electrics would displace! The next time your engine overheats, consider *its* contribution to thermal pollution!

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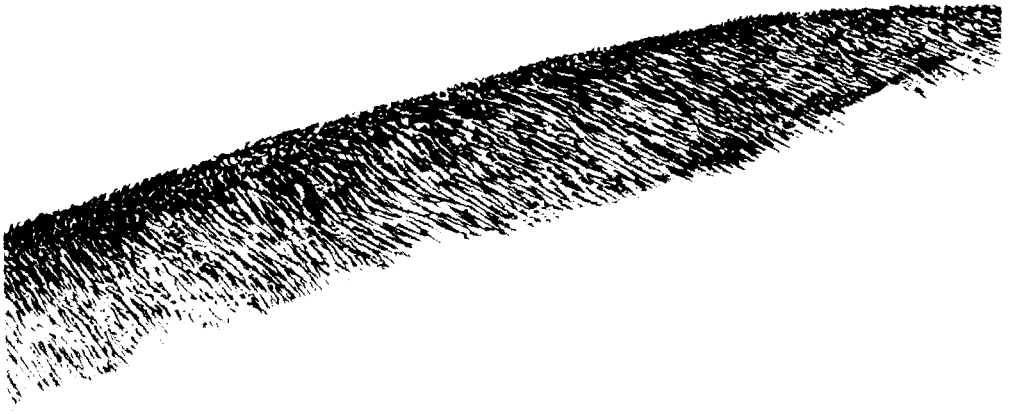

Hierarchies

First of Two Parts.
Theoretically Special Agents Sixx and Lowry
had the *ridiculously simple job*
of escorting one Royal pet sorki-dog from
Khandalar to Earth.
But for some reason some organization
was fanatically opposed to their movement—

JOHN T. SLOANE

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I

The picture in the monitor was steady, clean and sharp-edged, the colors true. The scarlet and gold draperies of the Jewel Room were shown so clearly that one could see them trembling slightly in the gentle but constant waft of the air-conditioning.

"You're certainly up-to-date, here." Sixx murmured, more to butter up the guard captain than from any real appreciation. The cameras and monitor had a Nipponese trademark, and the air-conditioning, too, was imported. He had seen better, and in any case his attention was focused on one small part of the action, not any pictorial effect.

"We spare nothing," the guard captain said, in careful Anglic, "when it is a matter of the Imperial Royal Treasures!" There were capitals in his tone, also a mild reproof that this stranger Earthman, strangely garbed, could imagine anything less than the very best for the Imperial Crown Jewels of the Three Worlds of Khandalar. He would have been shocked out of his mind had he known exactly what it was that Sixx was watching and waiting for. Truly, as one Security man to another, he was interested in the watchful system, but his eyes were for two men, down there in the Jewel Room. Two men had the velvet-hung splendor of that room all to themselves for a brief moment of privilege. Two men, if you discounted the eight eagle-eyed bowmen who stood, four to a wall, watching every bit as narrowly as Sixx and the monitor cameras. He didn't discount them at all. He, privately, felt that Jason Horn had underestimated their devotion to duty, and the next few seconds would prove it, one way or the other.

Of the two in the center of the picture, one belonged there by right. King-Emperor Lagas was tall, by Khandalar standards, almost five feet ten, and he didn't show anything like the eighty-four years he had lived, but then, as Sixx knew, the Royals of Khandalar were notoriously long-lived, with an expected lifespan that was the equivalent of a century and a half in Earth terms. His hook-nosed, black spade-bearded face was calm as he made slow gestures for the benefit of his guest. And now, arming back the ornate sleeves of his dress-cloak, he stretched one long arm into the central crystal cabinet that held the most prized gems of all. Sixx tensed slightly and moved a ready hand to a micro-switch in the lapel of his uniform. Any minute now!

The other man down there was as old as Lagas and four inches taller, but his dress was sober businessman blue and his hair, what was left of it, was a carefully brushed white fuzz about his skull. Jason Horn, Managing-Director of Interstellar Security, was long past the stage of flamboyance. That was something he could safely leave to others. His business

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was planning, and this scene had been planned to the last heartbeat. A badly-placed microphone picked up the dialogue in a faint murmur. Lagas was speaking.

"And, of course, the famous . . . one might almost say the sacred . . . Crown Stones of Khandalar. You have heard of them?"

"Naturally, Your Majesty. It would be almost criminal to visit your capital city, the seat of government, without taking the opportunity to see such a phenomenon. This is a very great honor."

"The honor might be fatal." Lagas had a wry touch of humor in his voice. "If you have heard other things, you have certainly heard this, that no one other than those of Royal blood may touch the Crown Stones. Be assured, it is absolute truth. I now hold the master shell in which they are all assembled. You see? I hold it so, and you may peer and admire. But never forget there are eight pairs of very keen eyes watching you and, even though you are my guest . . . should you stretch out your hand to touch . . . you are a dead man eight times! Interesting, is it not?"

Sixx restrained his imagination, which had a trick of running on at such times, grinned to himself at what must be in Horn's mind, touched the micro-switch delicately, and murmured,

"Go, man!"

Three seconds later, while Lagas was holding the precious bauble just so, in his fingertips, there came a measured double-thump at the massive doors of the Jewel Room, and a clatter as they swung open. Sixx grinned again. Just by himself, Roger Lowry was a spectacle to catch the eye and hold it, with his fine, noble head, his mane of pale-gold hair, his ingenuous stare, and his six feet six inches of poised herculean brawn. When you wrapped all that in the glare-white and glittering gold uniform-suit of Interstellar Security, he was something to demand a second, even a third, look. And that, really, was all that was needed. Now, after paralyzing all eyes for a long breath, he marched slowly and solemnly across a venerable polished floor, up the long center aisle—up to Jason Horn. There he halted, saluted, and declared,

"Ready when you are, Mr. Horn."

"A big one, that!" the guard captain commented. "He would make a good soldier. Perhaps a little slow, but strong!"

"Speed isn't everything," Sixx murmured. "Tell me, can you swing this camera to scan the whole room?"

"Of course!"the captain declared, first satisfying himself that the Public Cabinet was once more secure, the Crown Stones back in place, and Lagas chatting idly with his visitors. He put the monitor installation through its paces while Sixx pretended interest. What he felt was immense relief when he saw that

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the bowmen were down from their feather-to-ear stance, and looked relaxed. *So much for that* he thought, *one hurdle jumped, now for the next!* After a while the drifting monitor showed the small private party making for the main door, on the point of passing out.

"Thanks for the demonstration," he said, "but I can't stop any longer now, sorry about that. That's my boss down there. Looks like King-Emperor Lagas is taking him away to discuss business, and he will need me there. Which way do I go from here to join them?"

In fact Sixx knew the Palace layout almost as well as the guard captain, having studied it thoroughly on the way here, but it was the motto of Interstellar Security to "leave nothing to chance" and he was not about to change that now. He allowed himself to be led away by a young cadet in polished leather and a short sword, over ancient floors that gleamed with polish, by narrow passages of smooth stone with tall grudging window slits, and eventually to the King-Emperor's private suite. Pikemen stood immobile either side of the door, also in sturdy leather. An oddity, he mused, as the cadet gestured to the door. They had arrows,swords and spear pikes . . . but no armor? That said something for the Khandalar mentality, but he wasn't sure what, and let the thought run on a moment. By Earth standards, if your enemy had weapons, you worried about some kind of defense. Which he promptly copied, or bettered, and then you had to have a better weapon . . . better armor . . . and right there you had the genesis of an arms race! Maybe the Khandalar mind didn't have that pattern? The thought went nowhere and he let it slip as he leaned on the door, went in, and armed it shut behind him.

Lagas was seated in a worn old chair that looked comfortable, alongside a large round table. His ornate cloak had been cast aside, to show him in a simple dark tunic. On the table stood an interesting-looking jug and several crystal goblets.

Jason Horn, also seated, held one casually as he said, "Your Majesty, the is Rex Sixx, the other operative selected by me for this mission."

Sixx hooked off his helmet, tucked it under his arm and bowed easily. Lagas smiled.

"The uniform," he said, in flawless Anglic, "is so glaringly spectacular as to be almost an insult. So visible! Such a target! Come and sit down, Mr. Sixx. Here, if nowhere else, I can be comfortably informal. A precious thing, comfort. Doesn't that fancy dress make you feel uncomfortable?"

Sixx cast a quick glance at Horn for approval, then said, "It depends on who's looking, Your Majesty." He took a chair, moving it closer to the table, noting that Lowry was already seated and with a drink in his hand. "From a bow-and-arrow point of view I suppose it does stand out a

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bit, but we seldom operate in conditions like these. Practically everywhere else this uniform is enough, all by itself, to make any intending crook stop and think a bit. Interstellar Security has a reputation."

"That's the whole thing in a phrase," Horn endorsed. "That uniform is known, is a trademark throughout the spaceways. When my father started this business, almost a hundred years ago, he knew more about crime and crooks than just about any man alive at that time. He was quite a character, old Raphael. His idea was to gather all the data he could get, not just his own, but everything available, even going back into ancient history . . . on crime. Then he fed it into a strategy-computer and had it all analyzed and codified. Taught me to do the same. That data is constantly being updated. As a result, it's a fact that I'm proud of, that I.S. has yet to lose a consignment. We've had some very close shaves, a few tough ones, and we have missed a deadline or two but we have never yet failed to deliver. So far. And that is known. We don't brag about it, but we don't hide it, either. And that's the reputation backing that monkey-suit. It's a good one."

Lagas nodded thoughtfully. "It's a strange thing, Mr. Horn," he murmured, "that your culture and mine, so different in many other ways, have this much in common, that beliefs, ideas, abstractions, concepts are far more powerful and important than any amount of physical energies, or technological skills, new inventions, things like that. The way people think, what they believe, that is what matters. Wine, Mr. Sixx?"

The wine was highly palatable and smooth, with a delicate tang that hinted at a compromise between peppermint and orange-peel, but was neither. He sipped it, savored it, cast an appreciative eye over the relatively homely chamber, the scuffed rugs and plain drapes, the simple wooden furnishings, a niche filled with shelves stacked high with tape cassettes . . . and there was something about the gestalt that bothered him. His face must have shown it.

"Something puzzles you, Mr. Sixx?" Lagas asked. "Speak freely here. We have some alien improvements, as you have seen, but we have not yet reached the stage of bugging."

"That's part of it, Your Majesty. You see, Roger and I had hypnotape information on this culture, on Khandalar, on the way here. Orientation. There's a lot to know, but we merely got the gist. Earth first contacted the Khandalar three-world system in Twenty-ten. That's . . . seventy-four years ago. The contact has been constant . . . if very cautious . . . ever since. So we know a good deal. A very ancient culture; no one knows how old. A feudal culture. A stratified society. Peasants and seamen, artisans, civil servants, the military, and Royalty . . . and that's it.

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And that's the way it has been ever since who knows when. And yet . . . this could be anybody's parlor. In a Royal Palace? And you speak Anglic as easily as I do. And you don't act like the hereditary absolute ruler of fifteen billion people! Not that my experience of feudal royalty is all that extensive, it isn't. It's practically zero. But my picture is all wrong. Meaning no offense to you, of course!"

"Offense?" Lagas chuckled. "On the contrary, I am flattered. All you have said is true. I am a feudal monarch, the absolute ruler of fifteen billion people . . . in popular theory and belief. But no longer in fact. It is inertia alone that keeps the system going. My father was king-emperor when the first ships of Earth came here. He was then old, but wise. I say that with emphasis. It is a common myth with both our peoples that old age brings wisdom. It is not often true, but in his case it was. He was wise enough to see the inevitable almost at once. The inevitable . . . that contact between your culture and ours would bring change . . . change for us. Not many, almost none, of the other Royal houses realized it, not then. They are seeing it now, and not liking it. But they are wise enough, most of them, to be guided by me.

"You see, one of the wise things my father did was to send me to Earth to acquire an education. To learn something of your ways, your language, your freedoms, your technology, your democracy. Over there," he aimed a finger, "on the wall, is a photocopy of one of your most famous documents. I know it by heart. Listen. 'When, in the course of human events, it becomes necessary for one people to dissolve the political bands which have connected them to another . . .' You know it, of course?"

"Declaration of Independence, July 4, Seventeen Seventy-six," Sixx declared. "But you haven't any political connections with us, not out here on the Rim! Earth has deliberately played down the contacts . . ."

"Yes. I know. The political bands I am thinking of are those which have held the Khandalar culture together all down the centuries. They are dissolving now, moment by moment as we sit here. Soon they will be entirely gone. If we are to avoid total chaos something must take their place. We must build . . . indeed, in a small way we have already begun to build . . . a new system. It must be a system based on an educated citizenry, with free choices, opportunities for talent and ability, opportunities for progress. Sweeping changes, Mr. Sixx, and dangerous ones. But partly the reason why you are here."

"Now you've lost me altogether." Sixx looked his bewilderment at Horn, who shrugged easily.

"I'm none too clear about it myself, but I expect we'll all catch on in a minute or two, when it's explained. We're waiting for Andrew McLaren.

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Once he shows up we can get down to the real meat . . . and that should be McLaren, right now."

The massive doors sighed open and clicked shut again behind the newcomer, a small, birdlike man with a monk's tonsure of startlingly bright red hair, black brows over dagger-bright gray eyes, and a half-trot walk that belied his obvious years. He nodded briskly to Lagas, glared at Horn.

"Well, man, did you get it?"

"Certainly. Right here." Horn dipped two fingers into a breast pocket and brought out a small, sparkling, fire-glowing gem.

"Ah!" McLaren stood still for a moment, not moving, as if holding his breath. Then, like the release of some brake, he trotted to a massive chair and man-handled it across to the table before Sixx could scramble up to help him. "Your Majesty," he said, "you'll have to excuse my cavalier manner. I know exactly just how much that bauble means to you and Khandalar, but believe me it means every bit as much to me and to Earth science."

"It is understood." The expression on the king-emperor's face showed his internal struggle. "I am still Khandalar, still of the Royal blood, despite all my common sense and all my Earth education. That thing . . . it has power!"

"Of course it has. You two men better move up close and pay attention." To Horn he said, "Just put the damned thing down on the table where we can all see it. I'm nervous, too. I'd rather not touch it, yet." As Sixx and Lowry dragged their chairs closer he added. "You need to know exactly what it is you'll be carrying. Of course this is the real thing and that other one, in the Public Jewel Cabinet, is a fake. A duplicate, made from photographs and measurements supplied by me. That much is obvious."

Sixx nodded, remembering the careful discussions and elaborate rehearsals and timing that had gone into eluding those eagle-eyed bowmen down there. It had all worked, but it had never deserved to work, and he expressed a small complaint on that score now, to Horn.

"You took a hell of a chance, sir, making that switch in the few seconds while Roger was holding their eyes. I still don't see it. Not all eight!"

Horn chuckled easily. "That wasn't it at all, Sixx. His Majesty made the switch while he was reaching into the Cabinet. That was easy. Palm the fake, reach in . . . where no one could see his hand among all the glitter . . . and switch, bringing out the fake in plain view. Change hands to hold it up . . . and it was done, slow and easy."

"Then what was all that charade for?"

"Very simple. When Lowry made that diversion at the door, not one of those bowmen took his eyes away for a second. You can bet on it. That's

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what they are trained for. And what did they see? They saw His Majesty, very properly, put the jewel back, fast, and close the Cabinet . . . and *then* look round. And they will swear to that. Very convincing. And necessary. You'll see."

"So all right," Sixx agreed. "So we've stolen the Crown Jewels of Khandalar. Even with Royal connivance, that's a bit far out, isn't it? For that, they had better be worth a lot more than they look."

"They are!" McLaren snapped impatiently. "They are worth more than any cash prize you could name. And we are not stealing, only borrowing them. I'll say that again, only borrowing them. That is expressly understood."

"That is crucial." Lagas muttered, still staring at the small thing on the table. "I am a gambler. I think I have courage. But with a vast and ancient empire at stake . . . I need the insurance. They *must* be returnable, unharmed."

"Right!" McLaren extended his hands, now, nervously, still not touching the prize, like a man deliberately restraining himself from indulgence. "Now, let's get the details right. Not the Crown Jewels. Those are downstairs in the Jewel Room, and a pretty fabulous lot of gems they are, too—as precious stones. But these are different. These are the Crown Stones, which is a small difference in words, but an enormous difference in meaning. There are three planets, Loges, Metera . . . and this one, Aldan. Six ruling Royal families, two on each planet. One Crown Stone each. And all six are here, now. Once every ten years they are ceremonially collected, here in this Palace, and then taken back to their respective kingdoms to be ceremoniously displayed for a celebration period. Then back they come, to be replaced in the Union Shell, and placed on display. And here they are now."

Sixx studied the gem collection again, critically. A cube of some highly refractive crystal, with the corners rounded off a little; and buried in the center of each face a tiny red pinhead of fire. And the whole thing no more than an inch each way. Nothing much to look at. Some kind of power, McLaren had said, agreeing with Lagas. It wasn't very visible. He shifted his gaze to McLaren and waited, open to conviction.

II

McLaren spoke deliberately, obviously selecting his words with care. "Each Crown Stone has its own small shell, which in turn fits into the master shell, as you see here. In that condition the Stones are insulated, and thus harmless."

"Insulated?" Sixx queried. "That kind of power?"

"That kind," McLaren agreed. "And yet not. If only it were that simple. But it isn't. This is a power completely different from any we

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know. In fact I catch myself doubting that at times. The latest ten-year celebration is not long past. In that period with the Stones out of the Public Cabinet, and with the gracious assistance of His Majesty here, I had a third chance to investigate one of them at close quarters. As closely as possible with the limited equipment available to me, and with all the cooperation possible allowing for the demands of [illegible] and over-anxious guards. It's a wonder my hair isn't snow white. But there it is. Three brief times in over twenty years, general. A lot of waiting, impatience, and study. And I am absolutely certain of this much. The Stones are [illegible] of some kind, almost certainly on a molecular level, almost certainly rechargeable in some way by ordinary daylight. Hence the [illegible] insulation, and periodic exposure. And they are unthinkably ancient. Just one more instance of the immense and fantastic technology that was once known to the Khandahar people. An irritating and frustrating example, but immensely important. Because virtually all that technology is now utterly lost. Forgotten. No offense, of course, Your Majesty."

"That is perfectly all right." Lagas made a stiff gesture and sighed. "I appreciate the fact just as keenly as you do. There can be no doubt at all that our long-forgotten ancestors were wizards. My own small acquaintance with your culture, and some of the thinking inherent in it, has helped me to think back to them in a new light. It seems obvious now that they ardently desired to create a stable, secure and harmonious culture that would endure long. They were very wise, the Old Ones. Or very foolish, it depends on the point of view. For see, they succeeded. They achieved their stable culture, but at the cost, to us, of utter stagnation. No . . . worse than that. Not only have we not progressed in these hundreds of centuries, not at all . . . we have crept slowly backwards! We have ships that can and do leap from planet to planet inside our own system, and our artisans and craftsmen know how to fly and maintain them, but not how they work! We have the Royal weapons, the Wands, that can spit fire at a man, or stun him, or even kill him, by choice. And again, the armorers can maintain them, but do not know how they work. No one knows, now. So many centuries have gone by without the need to know how, or why . . . or even to ask the questions. When there is no need for change, why bother?"

"So the Old Ones achieved what they set out to do," Horn murmured. "They built a stable culture that was a going concern when our ancestors were still fighting over which was the best cave to hide in. Is that so bad?"

"The question is an academic one, now," Lagas said. "Once your Earth ships came, that was the end of it. I tell you, my father saw it right from the beginning. By now almost all the

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Royals, and most of the Civil Servants, can see it, too. Every year more and more of our young men leave the land, the plow, the net, young artisans leave their benches and tools, and they all seek service in your ships. They travel. They venture out into the stars. They see and hear new and strange things. And then they come home, and talk. Of course centuries of tradition do not die overnight. But they do die, eventually. As it is, already there is growing unrest. There are bandits in the hills, rebel groups in our cities and towns. Even, I am told, there are pirates in our skies. We have been forced to build new schools, with new teachings. We are seeing the start of labor protectives, guilds, unions. Our ancient culture is no longer stable. It is breaking apart."

"But what," Sixx demanded, "have the Crown Stones to do with all that?"

"It is really very simple." Lagas sat up straighter now, held his head high, his expression stern. "I am of the Royal blood. By ancient tradition I am appointed to rule. But I have much more than mere tradition to back me, to enforce my power. Only the Royal blood can command warriors, and men-at-arms. Only by Royal command, and in the hands of the duly appointed, will the Wands discharge their lethal bolts. And, above all, only to those of the Royal blood is given the power to control and change the minds of men, by the Crown Stones. With one of those in my hand, or inset into a finger ring, or in a diadem to be worn here"—he touched his brow—"I can detect and sense . . . and influence, the emotions, the thinking, feeling, decision and action of those around me. I can control them and compel them to my will. This is absolute power, against which there is neither defense nor dispute!"

There was a long-drawn moment of silence, and then McLaren said, very quietly. "That, gentlemen, is absolutely true. That much I am certain of, on my professional reputation. Don't ask me how, or why . . . I don't know. I can give you a jug-full of theories, for what they are worth. But the facts are established. Fact . . . removed from its insulating shell and so worn as to make skin contact with the living body, any one of those stones confers upon the wearer the power . . . ability . . . talent . . . you name it . . . to become aware of any positively held emotion or intention nearby . . . within a thousand yards at least, probably more . . . to be aware of it, and to alter it at will. Fact!"

The silence in the room grew thick. Sixx tried to evaluate the full significance of what he had just heard. He stared at the pretty bauble with a greatly enhanced respect. A little thing like that, yet it was, potentially, bigger than any bomb. To everyone's surprise it was Roger Lowry who broke the long silence.

"Why do you want to commit sui-

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side, sir?" Lowry asked quietly.

"It seems like that, to you? Perhaps it is, who knows? I have reasoned it all out a little differently. Just for a moment, disregard the physical power. Think of another power equally great, possibly greater: the power of belief. Ours is a hierarchical society, a pyramid. Royalty rules. The Civil Service administers. The military, a token force, applies pressure when and as needed. The artisans make and maintain the wheels. The peasantry supplies the raw power which turns them. In more than ten thousand of your centuries that pattern has not changed. So long as the great mass of the people believe in and accept absolute power, it will not change much. Before you people came, they did so believe because they had no other culture to compare. Now, truly, by slow degrees they are beginning to doubt, to seek change. And change is inevitable. But . . . change can come from either of two directions. From the bottom up, it is explosive, destructive. From the top down it can be peaceful. Before you came, change in either direction would have been impossible and unthinkable. As you should know from your own history, the prisoner does not necessarily leap to lose his chains. Quite often he is dependent on them for his reality, and does not know or care, that he *is* a prisoner. He would not know what to do with freedom if he had it, even if he knew what it meant.

"When a prisoner discovers he is confined, and has to struggle and fight to gain his freedom, he begins to believe there is something worthwhile in the very act of struggle, that freedom is something he must fight for. If, on the other hand, he finds his cell door standing ajar and no one waiting to menace his new-found liberty, he is much more likely to be amenable to reason. To move to the other end of the scale, now, no matter how far-sighted, or humane, or progressive a ruler may be, all the time he holds absolute power he has no real incentive to change things. But when that power is taken away from him he is under pressure. He *must* rule wisely. He *must* do what is best. He must show that he is qualified to rule, by ability rather than by some gift of power. Or face the disastrous consequences of failure."

"That fits!" Sixx said, all at once struck by the connection. "I saw that. You people have weapons, but no armor, no defenses. It's the way you think. When a man picks a fight with somebody else, he has to be either good . . . or dead! It's like that."

"Exactly!" Lagas agreed. "And I have thought, long and hard, along with the ruling heads of all the other families. Change is on us. We can fight it off, for a while, but not forever. Far better, then that we go to meet it. Better that we say 'We will not use our absolute power to compel. Instead, we will sit down and reason with you.' When a man realizes that he has no power except his

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wits, he will use them. So, when the Crown Stones are on their way to Earth, *we* will know they are gone. The other classes will not know . . . Khand forbid they should ever find that out! But *we* will know. The die will be cast!"

"You're taking a hell of a chance." Jason Horn murmured, and Lagas got to his feet abruptly, making the rest of them scramble to stand up, too.

"I know what I am doing," he said harshly. "I do not like it. I am afraid. I am tempted, even now, to snatch that thing away from you. But I have made my decision, and it must stand. Dr. McLaren, our agreement is fulfilled, I think?"

"To the letter, Your Majesty. The rest is up to us. We'll take care of it. And the other small matters."

They all stood respectfully as Lagas made a stiffly formal bow and went. Then Sixx turned to the scientist, wonderingly. "Agreement? What kind of a deal? Don't tell me Earth has *bought* this bomb?"

"Nothing like that." McLaren turned to stare down at the precious gem-assembly until Horn reached casually, took it, dropped it in his pocket. "No," he sighed, "we couldn't possibly put a cash value on a thing like that. But the scientific value is enormous. Staggering. Patterns in the brain structure . . ." he seemed to be talking to himself, contemplating some design the others couldn't know. "For a long time we've known . . . suspected, anyway . . . that there are super-conscious mechanisms in the brain. Must be! But how do you get at them?"

"Super-conscious?" Lowry echoed. "D'you mean the super-ego?"

"Nothing like that." McLaren grinned crookedly, seemed to be all of a fidget on the inside as if possessed with bursting ideas. "Not like that, at all. Difficult to explain in layman's language. Look, we commonly think that the consciousness, the fact of being self-conscious and aware, is the apex and top, the ultimate in being human. And that everything else goes *down* from there. A devolution. But it's not so. Tell me, suppose I could show you a new color, somewhere in between red, orange, yellow, green, blue, indigo, violet . . . would you be able to see it?"

"That's not a question," Lowry retorted promptly. "You've covered the visual spectrum. There are no other colors there."

"That's what *you* think," McLaren crackled. "And you think that simply because that is the way your eyes are designed, and your brain. If there were a different color in there, your eyes wouldn't detect it, because they aren't designed for it. And your brain wouldn't register it, because it isn't designed for that either. In other words, your senses, your whole nerve net, and your brain, already have patterns designed into them, patterns which sort out and select

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and arrange all the data . . . and the ideas . . . that your conscious ego is going to get . . . before it gets them. So you can reason, and think, and feel, in certain ways only, and those ways, those patterns, have already been determined, are already built-in. And that is a set of hierarchies in your own brain that you can never, by definition, become conscious of."

"It's a nice theory," Lowry admitted willingly. "But I don't see how you can prove it. In fact, on your own definition, you can't!"

"Prove it, no. But I can postulate it, on evidence that is right in front of your nose. For instance, you're a smart operator, or you wouldn't be here. So you can learn, and have learned, a lot. But when did you learn how to learn, and who taught you that?

Or, let's take logic. Logical reasoning has one characteristic above all, that it is not human, as we know it. It is a lot smarter than we are. All the time we are compelled by logic to do things we don't like, don't want to do, simply because we know how smart it is. And the same is true of mathematics . . . it is smarter than the mathematicians. And that is also true of intuition. And where do they all come from? We didn't invent any of those. We discovered them. They were already given. Built-in. Even the language we speak, no matter what it may be, even this hideous click-and-choke lingo they talk here, has built-in rules that were never invented, but had to be discovered. Sure we fool around with grammar in an attempt to impose some kind of conscious rules, but you learned to talk a long time before you learned any grammar. There are hierarchical systems designed into the brain as the result of millennia of selective evolution. Successful patterns. And they are super-conscious. Pre-conscious, if you prefer that term. But there they are. And all we have ever been able to do, so far, is speculate and wonder about them. Because they are, by definition, out of reach. But now . . . maybe . . . we might just be able to get a fingernail hold on how some of the machinery works. Maybe!"

He turned to Sixx. "To answer your question, Earth has agreed to give massive aid to Lagas, and to the whole Khandalar culture. Not with money, that would be pointless and futile. But it is going to cost us money, just the same, to provide know-how and advice in the shape of experts. Teachers, technologists, social scientists, organizers, public relations, the whole thing. A massive operation. There's a ten-year deadline. Not that it will all be over in ten years, nor even a hundred, come to that. The idea . . . the *hope* . . . is that we should know within that time whether we have achieved enough to show that it has a chance of working out. Hopefully, by the time the next ten-year ceremony is due, Lagas will be able to make a public renunciation of his absolute power."

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"And if it fails?" Sixx demanded. "If the whole thing blows up?"

McLaren hesitated. "Put it this way," he said at last. "It's going to be a long hard row in any case. There'll be clashes, small revolts and uprisings, a lot of pain and suffering, possibly some bloodshed. It's unfortunate, but we're making omelettes here, and the eggs have to be broken. That's all expected and allowed for. Hairy moments. But, if the whole thing proves to be unworkable, if it *all* starts to go sour, then it will go fast, and there's only one way to stop it. Those gems. They had better get back here fast, when called for. That's what Lagas meant by insurance. He won't ask for them to be returned unless he desperately has to, because that will mean an admission of total failure, and he won't like that. So, if and when he should ever ask for them to be returned, he wants them . . . fast! That is why we are only borrowing them, why we will treat them with great care, and why we are entrusting them to I.S. as carriers. I think that about covers it, Horn. The rest is all yours, and good luck, gentlemen."

A minute or so after he had departed Roger Lowry stirred, his good-looking face unusually serious. "Isn't this just a bit too big for us, sir?"

Horn pulled down his jutting white eyebrows and peered up at him from under them. "First time I ever heard an I.S. man say that."

"You're the boss. If I'm talking out of turn, you just say. And I can see why this can't be done with a squad of Marines and the Space Navy standing by. That would advertise the cat right out of the bag, all right. But, as a kind of rule, we have insurance. We can cover loss value, or replace. But not this time. Those baubles are unique."

"That's right, they are. But we didn't get a reputation by taking on the easy jobs. And we have a thing or two in our favor, to which I am hoping to add more. Here, stow the thing away in your belt."

He handed the tiny object to Sixx, who had to rein in his imagination to overcome the tingle he felt, and which was almost certainly subjective. The thing was not alive, it merely felt that way. Unfastening his suit front he snapped open a pouch on his body-belt and secured the precious item within.

"For one thing," Horn resumed, "we have the present setup. The Crown Stones are visibly and solidly there, in place, in the Public Cabinet. Very few people will even dream of suspecting that Lagas could be so insane, or so treasonous, as to play hanky-panky with them. Secondly, nobody but a Royal would . . . or is in fact allowed to . . . go anywhere near the things. And, incidentally, the influence works, whatever it is, with anybody. Not just for the Royal blood. That part of the Royal blood is a myth. McLaren is certain about that. But it is not a myth on the other

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thing, the longevity. That's a true datum, and it reminds me of a score we ought to put on the opposition side of the ledger."

"It's this: up to about a year ago there was a team of scientists on Loges studying the longevity angle. In a careful, slow, delicate way, doing a checkup on lifelines, diet, living habits, that sort of thing. As I said, in a careful way, so as not to offend anybody. But not careful enough. Just about a year ago the whole team was jumped by bandits in some out of the way spot, and nearly all of them were wiped out. End of project. I tell you that just to get across the point that this is not necessarily a pushover. And there is another thing, too." He rose, crossed the room silently, threw open the massive doors and peered out, nodded to the two pikemen guards, came back in again.

"Lagas is no fool. You've seen that for yourselves. But he has the same failing all idealists have, he can't understand just how corrupt a society can really get. The Palace, in fact the whole capital city of Casta, is a hotbed of rumor and gossip, of cells and groups and factions. Just like any other seat of Government anywhere. And Lagas may think that he holds this secret along with the kings of the other realms of Khandalar . . . but I say a secret split six ways is a highly fragile thing indeed."

Sixx snorted. "I thought you said we had things in our favor?"

"We do. Gossip and rumor are one thing, unrest is another, but positive and violent action is something quite different. That calls for organization, some kind of certainty."

"All right, if you say so." Sixx stirred. "When do we leave? The sooner we can get back inside our ship and en route to Earth the better I'll like it . . . " he faded to a stop as he saw Horn's face. "Not like that?"

"Er . . . no. Not exactly. It's going to be just a shade more complicated than that, I'm afraid."

III

Sixx settled back into his chair and sighed. "If it's anywhere in the I.S. Handbook, it must be in the fine print that I've never had time to read."

"What?" Horn asked obligingly.

"That bit where it says it's against the rules for us to have an easy, straightforward case, just once in a while."

"Hah!" Horn chuckled. "You and Lowry are my best team, that's why you were selected for this job, and you don't get that kind of reputation by doing milk runs."

"Honestly and truly, I wouldn't mind if somebody else had the compliments, once in a while . . . sir! Anyway, why can't we just grab that jet-copter on the roof, scoot back to the coast, to Padash, and our ship, and straight home?"

"Because," Horn retorted, "that would give the rumors the teeth they

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now lack. Think. I come here, have audience with Lagas. I'm known for what I am, no way of hiding that. Then you two show up, marvelously conspicuous. You stay only a brief while. You take off again, and straight back to Earth. It's easy to add up, isn't it? You came for some thing. You got it. You've gone off with it. Follow that train of thought very far and Lagas is due to have a showdown a long time before he wants it. So, we need a smoke screen . . . which I have already fixed . . . and, you'll excuse me, I think that's it now!"

He crossed the room again, answering a resounding knock on the door, and opened to reveal a pikeman just standing aside in favor of a highly decorative Court lady. Sixx, by long habit, was immediately interested. The orientation tapes had carried brief details on Court procedure and dress, enough for him to realize that he was looking at a lady-in-waiting. This particular specimen was the Khandalar average in height, about five three, and elderly, and angular. A memory from the tapes told him that Khandalar standards of beauty favored the lean and angular type, but he hadn't realized it was this extreme. The lady swept them all with a fast glance, settled for Horn, bobbed slightly, and said, in very careful Anglic:

"You are Jasonhorn?" She ran the names into one long sound. "The Princess Mellida will see you now."

"Thank you very much," he bowed his head. "If you'll show us the way? Come on, boys, this is it?"

With their helmets tucked under arms the two agents and their chief let themselves be led, slowly and steadily, along quiet corridors and shallow-pitch stone stairways to an entirely different part of the Palace. Sixx had put to one side his momentary disappointment at sight of the Royal lady and was now idly curious about her dress. It appeared to be made up of a large number of long strips of gorgeously colored sheer stuff about six inches wide, randomly and perilously secured here and there with strings and loops of jewelry, so that she moved within a constant flutter and ripple of drifting ends. On anyone else it might have been tantalizingly revealing. On her it was just a mess, to his Earthly eyes. If there was design to it, he couldn't see it.

With the other part of his attention he listened to Horn's murmured explanation as they strode along. "There should have been something in your tapes about the Royal household, and in particular about the Royal pets. One of them, a thing called a sorki, is rather special. The Royal Sorki. Supposed to be a distant relative of the common, wild bassorki, but different. Extremely rare. The bassorki is a semipredator, something after the style of a small wolf, but the Royal version is purely a pet. Something parallel to our Siamese cat, or the Royal Pekingese dog. That kind of thing. Anyway,

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very rare, very scarce, absolutely restricted to the Royals, and even they have no more than one clutch, brood or pack, whatever it is, per family. Now there are all sorts of pet-animal groups on Earth who'd give their ears to have a Royal pet. Preferably, of course, a female.

Sixx came alert suddenly. "Oh, no!" he protested.

"Oh, yes!" Horn chuckled. "It wanted some doing, but between us, me, M'Caren and Lagas, we persuaded Princess Mellida to part with one. Not that it was any great sacrifice on her part, in fact. It's the custom, once the brood female has whelped, or whatever it is they do, and the offspring established, to have the old one put down. But not this time. Exclusive to us. Handle with great care. Deliver safe and sound and in good health. Worth a small fortune to us, but not to anyone here. Good, yes?"

"I suppose!" Sixx sighed, swapped rueful glances with Lowry. Livestock were always the worst. Anything else you could take full responsibility for, and feel confident, but a life form could lie on you for no predictable reason, just whim! And pets were worst of all, needed coddling, special care, diet . . . ah well! "You certainly got your smoke screen," he admitted as they turned a corner beside a spectacular aquarium. "But this means we'll have to travel tourist!"

"That's right. The slow route. And you'll be conspicuous, maybe just a trifle ridiculous. But, in the circumstances, that's all to the good, isn't it?"

Sixx sighed again. The argument was unbreakable, and in any case he had no more time, for their be-ribboned guide had now brought them to a set of rooms visibly and noisily devoted to the care and cosseting of furred and feathered friends. The large chamber in which they were requested to wait was carpeted in a plain yellow woven material that bore all the spotty signs of having been scrubbed hard and often here and there. The walls were half-hidden behind a riot of flowering plants that loaded the hot air with fragrance. Against these stood a profusion of bird cages of all shapes and sizes, all open to allow the occupants the run of the room, although "run" was hardly the word. Another part of his orientation came back to assure him that these birds, presently savaging the air with ear-hurting screeches and swooping crazily about in streams of color, were all "soft-beaked and live by sucking nectar from suitable flowers" but the reflex urge to duck was hard to stifle.

He caught sight of a slow-stalking four-legs in one corner that was either a much-too-big cat, or an undersized tiger, in everything except minor details, like a glossy green pelt and amber-yellow eyes. Their original guide-lady transferred them to another who was even older and more angular, and he put his atten-

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tion back on the tiger cat, wondering to himself just how many of the feathered friends would survive, and for how long, if yellow-eyes had his way, with those visible claws and fangs of his. The second guide returned.

"Her Highness, the Princess Mellida, will be here in a moment."

He sharpened his attention again. A Royal Princess! Common sense told him that she would be just as angular and uncomely as all the others, but there was a magic ring to the words that caught at his imagination. Commom sense won. Princess Mellida turned out to be even older, possibly more angular, just as randomly dressed, but quite pleasant as she exchanged formal greetings with Horn. Seemingly it was part of the Royal obligation to be able to speak the foreign tongue, and that was a small blessing, for the native Khandalar speech was, as McLaren had said, a click-and-choke business that he could understand a little and speak not at all. His attention wandered again, went back to the magic—a Royal Princess. In all the fantasy-tapes high-born ladies were always radiant, super-persons with some inner charisma that set them apart from the herd, but in all his limited experience of meeting "uppers" he had yet to see one who looked anything more than just tediously ordinary.

One day he mused, reiterating an old dream, *I will meet the girl who, at that very first glance, will make me catch my breath, will stun my senses, dazzle my eyes . . . and all the rest of that. One day. There has to be one girl like that, somewhere, else where did all the fantasy writers get the idea from in the first place?*

Princess Mellida was explaining now, unnecessarily, just how precious and valuable her pet sorki was, how sadly she would be missed, how she needed very special care and attention.

"My men are fully qualified to take care of everything like that," Horn assured her firmly.

"We are?" Sixx queried in whispered amazement, and Horn made a quick gesture to hush him.

"Just the same, Your Highness, we would be grateful for some codified instructions, a manual, some kind of guide? The responsibility is indeed great . . ."

"That has been taken care of. I have appointed one of my staff to go along with my precious Quema and take good care of her."

"Oh!" Sixx breathed. "Oh brother!" He watched Mellida smack her hands smartly together and call out:

"Elleen! You may bring Quema now, quickly!"

He swung, ready to protest. A Khandalar female, on top of everything else, would be just too much! All eyes were now on an arch to the right. The protest withered in his mouth. It happened. There she was, the impossible dream made real. In

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that long-drawn moment he became two people, the one aside and sneering cynically as his other self was caught breathless, stunned, dazzled, and all the other symptoms of acute infatuation. This girl . . . woman

was tall, fearfully and wonderfully rounded where it mattered, sapling-slim everywhere else, Madonna-innocent, blond, her gold-sheen hair held by a silver filigree band across a noble forehead away from cornflower blue eyes . . . cherry-red mouth . . . satin and cream skin . . . grace . . . his analysis collapsed into total incoherence as he just stood and absorbed her through his pores, and remembered to breathe after a while. No one else seemed to be affected. Princess Mellida was brisk.

"This is Elleen Stame, who has been here studying all about sorkis and Quema especially. I have appointed her to accompany and take care of my precious one."

Sixx dragged his attention away from the radiance to the "precious one", and thought the description a shade overdone. The sorki was a small thing, its bent and spindly legs supporting it no more than six inches from the floor, its little lean body oddly distended about where its stomach ought to be, its short tail up in a tight curl, and its black pop eyes bulging either side of a ratlike head

but all these particulars faded into insignificance when compared with its enormous sail-plane ears, either of which was easily as long as its entire body. All over, even those ears, it was a sheeny gunmetal blue. Sixx let his critical eye follow the line along from its jeweled lead, up to the flawless wrist that held it, along a Grecian arm, and happily back to his dream vision again.

"This is unexpected," Horn was saying, carefully and politely, "but a great relief and a very thoughtful gesture on your Highness's part. We are very grateful for the arrangement. If Miss Stame will be responsible for the care of Quema, my men will attend to everything else. You can rest assured they will not fail. And I think that just about takes care of everything, apart from the official transfer documents."

"Of course." Mellida turned now and aimed an admonitory finger at the sorki and spoke to it, presumably bidding it farewell and charging it to behave, seemingly not in the least affected by the animal's sublime indifference to her words. The tiger cat had prowled near in curiosity, and Quema moved now, aimed her pop eyes balefully, spread her sail-plane ears, and whistled a shrill note. The cat-creature backed up, hissed, and departed.

"All right, boys," Horn declared cheerfully, "it's all yours. I'll leave you to it"

"A minute, sir!" Sixx spoke urgently, stepped across to his chief to touch his arm. "The smoke screen is fine, great, but it wouldn't hurt to have a little added insurance. And I know what a devious character you

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are. You just wouldn't happen to have another fake copy of the gems on you, now . . . ?"

Horn chuckled. "You shaved that fine, Sixx. I nearly lost a bet with myself. She's a very pretty girl, isn't she? Enough to confuse a man a bit? Happy to see your brain is still working well. Here." They shook hands ceremoniously and something cool and roundedly cubical passed between them. "I had already planned it. Now mind you don't confuse the two. The one in your belt is the real one, this is the phony. And good luck. I'll have everything laid on and waiting, all you have to do is get the whole shebang safely back as far as Armstrong Base, Luna. See you!"

And then he was gone after Princess Mellida, leaving it all up to Sixx and his partner. He turned to see Lowry crouching, facing the sorki, not making any overtures, just swapping stares with it. He strode back to confront Miss Stame, to look at her and hope that he wasn't staring. Foolish words came spontaneously to his mouth.

"You're human, surely?" he demanded. She giggled.

"Gosh!" she exclaimed. "What a silly question to ask a girl! Of course I'm human. Don't I look human?"

"Yes," he said, softly and sadly. "You do." She also sounded human, all too much so. He could almost see the shattered fragments of his vision on the floor at her exquisite feet. That voice! As resonant as a lead bell, as sweetly musical as cracked tea cups, as appealing as a five-year-old's first violin lesson. He ordered his face to smile. "All right, let's get moving, shall we? You'll have stuff to pack, of course, and gear for the pet, but, if you're quick about it, we might be able to catch a lift on the same chopper that Mr. Horn will be taking to the coast . . . "

"Oh, no!" she squealed. "Quema couldn't possibly travel in a flying machine. She would be airsick. She's awfully delicate!"

"I should have known," Sixx sighed resignedly. "So what do we do?"

"It's all been arranged. There ought to be a gracca train in the courtyard by now, waiting for us. Just a minute!"

One of the attendant ladies had brought in an ornate box which she now deposited on the floor. Miss Stame went to it, crouched and moved the catches which let down one side to reveal a silk-padded interior, with cushions and a breathing-grille. She turned, tugged on the lead gently.

"Quema!" she called. "A li! A li!"

Sixx watched in fascination. The Khandalar costume, randomly inadequate on the other Court ladies, was utterly unable to contain this kind of shape and development. But Quema was not in the least impressed. The sorki goggled at her, whistled, and stood fast. Then, quite calmly, Lowry put out two huge hands, scooped the beast and dumped it efficiently within the box,

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drew the end of the lead from her astonished grasp, slapped the side of the box shut and stood, tucking the whole thing under one arm.

"We'll wait for you downstairs, Miss," he said blandly. "C'mon, Rex, guard me, huh?"

The near-noon sun struck warmly on them as they reached the courtyard and saw the transport that awaited them. Sixx eyed it dubiously. Cane basket work, slender poles, and leather lacings made a kind of litter that was slung about four feet clear of the ground between four patient oxlike creatures . . . greece that looked powerful enough to carry anything the structure would bear, but slow. He hoped he wasn't going to be required to drive these. Then the distant clatter of a helicopter drew his head back, his eyes up in time to see it wheel away from the Palace roof and off rapidly into blue distance. Horn would be on that thing, with McLaren sitting back in air-conditioned ease for the hour it would take them to span the one-hundred-miles-plus trip to the coast; there to the splash-down spaceport of Padash, into a fast and comfortable executive ship, a fast twenty-hours warp to Sol, Armstrong Base, Luna.

"Isn't that just great!" he muttered. "Around noon tomorrow they'll be as good as home, while we will be something like half the blistering way to Padash! Some people have it easy."

"You heard what the man said, Rex. For us, they pick the hard ones." Lowry dumped the carry-case on the litter, hitched himself up alongside it and armed off his helmet, looking serenely unworried. "Compliments, yet!"

"And you heard me tell him, that kind of compliment I can do without. Once, just once, we ought to get an easy one."

"We have pleasant company anyway. That Miss Stame is a pretty girl."

"So long as she doesn't open her mouth!"

"For the intellectual side of life you can always listen to a teach-tape, talk to a computer, even read a book!"

"I suppose. I wonder who she is, anyway, and how come she's here, in residence . . . and as a sorki expert at that?"

"Better ask her," Lowry advised. "Here she comes now, with baggage!"

Sixx took a hard look at the laden Miss Stame, and the attendant relays of staff bearing boxes, bags, bales and bundles, sighed, and slid down to the cobbles to go and meet her. "All this is necessary?" he demanded.

"Some of it is Quema's," she admitted, "but most of it is mine. Isn't it funny the things you collect? But as I'm going home and may never come back, I couldn't bear to leave anything. Will it matter how much I take?"

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Sixx watched the clutter being piled up and shrugged. "All part of the job, I suppose. If the gracca can stand it—" Four leather-clad pikemen with Royal flashes had come to stand, one by each beast, ready to mount up. They didn't look worried, so he assumed it would be all right. The basket work and leather sagged, but held. He gave her his arm, and a boost, so that she could scramble up and seat herself beside Lowry, with room for himself on her other side, and the precious Quema riding behind them.

The pikemen outriders mounted up briskly and the gracca started to move slowly, and ungracefully out of step for a moment or two as they wheeled around in the courtyard and made for the exit arch, and then more bravely as they gathered a trot and got into a kind of rhythm. They made plenty of clatter on the cobbles, enough to warm any unwary pedestrians out of the way. All in all Sixx was pleasantly disappointed at the turn of speed and the gentle swaying. A hundred miles of this might not be too arduous after all.

"I'm curious about you, Miss Stame," he came directly to the point most occupying his mind. "We Earth people aren't exactly persona grata here in the K-culture unless we're accredited scientists. And not even then, according to Dr. McLaren. Yet here you are, established in the Royal household, on the staff, in charge of the Royal pet. That's quite a trick. How did you work it?"

IV

"Well," she said, as the litter swayed around a sharp corner, "I suppose I'm not exactly a scientist. Not really. But I was working with a scientific team, as an assistant on Loges until about a year ago. Dull work it was, too, but it filled in the time. And then, of course, there was that terrible business with the bandits and everything was spoiled."

Even Lowry was startled. "You mean . . . you were one of that team that got jumped by bandits, and wiped out?"

"Not all wiped out, silly!" she squealed. "I wouldn't be here, would I? No, what happened was this. My uncle sent me on ahead, with Dr. Lafarge, on to the next village, to arrange for food and billets for the night, while the rest of the team broke camp and gathered everything together, ready to follow. They were expecting to arrive somewhere about sundown or just after. We often did that kind of thing. Dr. Lafarge and I were the only women on the team, and the men would never let us do any of the hard work. And my uncle always said I was much too valuable ever to be allowed to go anywhere on my own."

"Valuable," Sixx quoted resignedly. "You'll have to excuse my ignorance, but valuable, how?"

"Well, for one thing I speak the language, fluently. You see? Anyway, we reached this village. Rosper, it was. And we made all the

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arrangements. And we waited. And they didn't come. In the morning we rode back . . . and found what was left of them. Dr. Lafarge took care of all that part of it. They were all dead and all the equipment, the stores, the records . . . everything, all smashed and burned. So that was the end of that. Fortunately we weren't too far away from the coast and a splash-port. And an Earth station. So we were able to get that far, and then Dr. Lafarge was able to get help for us. She returned to Earth eventually, but there wasn't a lot of point in my going back. You see, as I said, I'm not really a scientist at all. My uncle was taking care of me."

"Your uncle," Sixx responded, fascinated despite himself and perfectly willing to play the patsy. "Excuse me again, but who was he?"

"Why, Sir Bernard Monkton, of course! He was in charge of the team!"

"*Wow!*" Sixx murmured respectfully. Monkton was a big name. The man who, in all probability, knew more about the diffuse and difficult subject of gerontology than anyone else alive. And, now that he was dead, it would be no easy task to find someone big enough to take his place. No wonder the project had folded. And this birdbrain was his niece!

"So what did you do then?" he prompted, giving only half an eye to the fortress-thick walls as they clattered through the West Gate of the city. "You were all on your own. No visible means of support. Tough."

"That's right. But Uncle Bernard had told me, often, that if ever I needed help I was to seek out Dr. McLaren and ask him. So I did. I radioed him from Loges, and he arranged everything. He fixed it for me to come here."

"And he got you a soft job as keeper of the Royal sorkis, just like that?"

"Oh that! That was easy!" she exclaimed, setting his teeth on edge. "Nothing to it, at all. All I had to do was to learn about sorkis. And it's all written down and preserved in the records, you see. It only took me a few minutes!"

Sixx drew a careful breath, leaned forward to look past her at Lowry and shake his head, just fractionally, in resignation. "It only took you a few minutes to read all the records and learn all about Royal sorkis," he repeated.

"Of course!" She opened her beautiful blue eyes wide, very close to him, and made a ravishing smile. "I can do that. Easily. It's my only talent. You see, I'm mnemonic. That means . . ."

"I *know* what it means!" he interrupted firmly, just a little too loudly. "You have eidetic recall. You remember things."

"That's right." she crowed happily. "Anything and everything. It's a gift!"

"Yes," he sighed. All at once he felt tired. Life could be grossly unfair, sometimes. Here he had at last

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met the girl of his dreams, perfect in every detail and ravishingly displayed in breeze-blown ribbonry. Except that his dreams had carelessly omitted to specify the voice, which was an insult to the ear, and had completely overlooked her mental equipment . . . so she had to be a nut! A freak, yet!

"Time you said something, Roger," he offered. "I seem to be doing all the responses, so far."

Lowry was as placidly calm and competent as always. "Do you have to make a special effort?" he asked curiously. "To remember stuff, I mean. That is do you select? Like, for example, the periodic table of elements . . ."

"One. H: one-point-oh-oh-eight-oh. Two. He: four-point-oh-oh-two-six. Three. Li: six-point-nine-three-nine. Four. Be: . . ."

"Hold it!" he interrupted gently. "That's fine, but you didn't answer my question. Do you have to try to remember, or does it just happen?"

"I don't know," she sounded deflated now. "It just happens. I think. I don't know. I don't really *know* anything. Not really. Not to *know*. You have to ask me questions."

Sixx turned his head away, tried to give his attention to the rough countryside they were passing through. A nut. A freak. A moron, even! He heard Lowry coping, asking her, patiently, to recite everything she knew on the subject of the care and welfare of Royal sorkis, and he had to grin, wryly. Trust Roger to put his finger on some way of turning a difficult situation to good advantage. Miss Stame started in happily, yapping away, reeling it all off, anatomy, markings, habits, food requirements and preferences, mating habits, ancestry, care and attention, showpoints. . . . the whole book.

The peasant small-holdings gave way to stony ground and scrub, ragged hills breaking the skyline on all sides, the dirt road leading ahead to a narrow pass between two crests. There would be no traffic problem. This road was only used to provide the occasional link between Casta and the splash-port of Padash and there wasn't much commerce this way. The sun overshot noon and began to slide down the sky. Sixx relaxed into a half-doze, lulled by the quiet drone of statistics and the gentle swaying movement. On the other side of that gorge, he decided, they would make a halt, take a spell to rest and eat, and then go on until dark, or the halfway village, whichever was first. The gracca were making a good fifteen miles an hour and looked able to keep it up forever.

Semisacred animals, used only for work, never for food. What was so wrong about a feudal culture, anyway? Who would want to change all this open country and peace and quiet . . .? The little microphone in his lapel emitted a small squeak that sliced away his doze instantly. He turned to stare at Lowry, reaching by reflex for his helmet.

"What?"

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"Not sure. Movements, on ahead and up, either side. People up there mighty curious about us. Could be just gawpers, but it could be ambush, too."

Sixx jammed his helmet into place with a movement that looked casual, but wasted no time. Lowry had more senses than a cat and was not given to saying "Woof!" for fun. Sixx trusted his senses.

"You grab the pooch," he said over his shoulder, "and I'll take the lady." He braced himself for a fast scramble.

The essential points of difference between the Royal sorki and the more common bassorki are size, fecundity, fate . . . here, what the hell was going on about?"

"Nothing for you to get in a fidget about, Ethecart. Just keep right on where you are."

His peripheral eye caught just a flicker of rapid movement, a flying splinter of sunlight, and it was enough. All in one explosive movement he grabbed her securely and launched himself sideways and over, taking her with him. Hearing the screaming hiss of the something that struck him a violent blow between the shoulder blades, and the wail as it went disappointedly away. He struck the dirt road catlike, heard a strangled scream from somewhere else, and then he was under the litter, touching, putting her down, gone for gently.

"Stay still!" he snapped. "And keep quiet!"

Her name, Lowry from the other side, bulking huge, with the sorki-box under one arm and an arrow trapped in the crook of the other.

"There're at least six of 'em," he hazarded. "They got all four of our riders and both of us, all in the one flight. Those fellers can surely shoot!"

"Yes, but they're going to have to come up close to finish us off."

"Gives us a minute or two. This is quite a bolt!" He slid the arrow across to let Sixx see the razor-sharp barbed head.

"Pretty toy. What d'you suppose they're after, loot? Or more?"

"Pickings, I reckon. Anyway, we're all dead."

"Check!" Sixx grinned. "Let them come and find out, huh?"

Miss Stame was completely lost. Her hair was down about her face, her startling pieces-gown in utter disarray, her blue eyes staring as she huddled between them. Sixx took her arm firmly.

"Listen carefully," he told her. "This is what you do. You lie down, there. You lie still. You do not . . . repeat *not* . . . move until one of us tells you to. All right? Do it!"

A moment later all three were artistically prone, the two men so arranged as to be able to see and grab, if it came to it. They could all hear Quema in her box, whistling angrily. Sixx concentrated on shutting out that noise, and other distractions, and listening for clues. Soft noises. The slap of leather sandals on rock

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and rubble. The cautious calling to and fro of several voices. Now he saw feet, and hairy legs. Then sun-brown weather-beaten faces tilted sideways, with squinting eyes. Proddings . . . rough ones . . . from the butt-ends of spears. Much tongue-clicking and wonderment over the glare-white uniforms and glitter-gold facings. And gabble, that he could follow well enough to know that someone in charge was ordering.

"Drag 'em out where we can see what we're doing!"

And others, not so confident, who pointed out the uneasy absence of any signs of blood. But then rough hands grabbing and heaving, a flicked glance to see Lowry's bulk disappearing to the other side, another, riskily, to weigh up the opposition. Four sturdy little men, rough clad in leather, spear in one hand, broad-bladed short sword in belt, quiver and bow slung back out of the way. Right. He collected his energies. Clumsy fingers started investigating his helmet.

Coming suddenly alive, he grabbed, seized wrists, heaved and got himself up at the expense of the man he held, kicked his feet out from under him, gave him the full force of an armored knee in his face as he fell, spun him away, and went round himself. Balancing, he kicked another man into folded-up agony, then tramped forward, arms eagerly stretched. The third man was lost for what to do with his spear while trying hopelessly to drag his bow forward, but the fourth had slightly faster reflexes. He already had his broadsword out and slashing with it as Sixx moved, set his feet, hunched his shoulder to the blade and rocked with its impact. Then he rocked back, chopped at that numbed arm, grabbed the sword with his other hand as it fell, spun and threw it violently at the man who was still stupidly trying to unlimber his bow. Not bothering to follow its flight he carried the spin on all the way around, to see the numb-armed swordsman agape in wonder. Reaching out almost gently with his left hand, Sixx nudged him into position and then hit him with a right that came all the way from the litter back there before it exploded as a fist to the jaw.

And that part of it was all over. With one quick and comprehensive survey, he trotted, flexing his fingers, around to the other side of the litter. And stopped to chuckle at what he saw. Four supine bodies were distributed in fine disorder about the road. Lowry held a fifth in his left fist, choking him purple, while with his right hand he reached up and back and hauled the sixth from his leechlike cling between his shoulders. Then he brought the two together with a solid thud, shook them, and threw them away.

"Persistent little feller, that one." he remarked. "Kept right on trying to open me up with his sticker.

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Couldn't understand that it was a waste of time. Just couldn't get it!"

"He'll never get it now." Sixx dusted gently at his suit and sent a keen stare about the scene. "Seems like that's the end of the performance. This bit of it, anyway. Say, Roger, d'you reckon they'll ever catch on to the notion of armor?"

"In time, maybe, but let's not wait around for that. Better rescue the fair damsel. She'll be wondering what's going on."

Miss Stame crawled out from under the litter more wide-eyed than ever. She goggled at the fine display of bodies. "Gosh!" she shrilled. "What happened to all those poor men?"

"We did." Sixx told her gravely. "We often do. I'm afraid they chewed up a bit more than they could bite off. Never mind. We'd better get on if we hope to strike a village before nightfall."

"Village." she said, blinking. "Ostrik. Forty-nine stads from Casta. That's equivalent to fifty-one miles. It can't be much farther on."

Sixx studied his chronometer, calculating their recent speed as about fifteen miles an hour . . . for a little over four hours . . . and concluded that she couldn't do math. That, or they had passed the village without noticing it.

"Never mind that," he dismissed it. "One of us is going to have to ride point, maybe both of us. You'll have to mount guard on Quema all by yourself."

"But what's going to happen to these poor men?"

"We will do as much for them as they would have done for us, the same as those other bandits did for your uncle and his team. In short, we will just leave them here for somebody to find. We have other things to tend to—when you're ready."

He boosted her up on to the litter again, glad at least that she showed no signs of being the hysterical type. On afterthought he asked: "You're the fixer type when it comes to villages and accommodation, I hope?"

"Oh, yes!" she said. "I can handle that all right."

"And expenses? Do you have local currency?"

"Won't need it. We'll just charge it, to the Palace!"

"That's good thinking," he admitted, and went away to mount up. The gracca had short stumpy horns which made good handholds, and the heavy ridges of muscle across the shoulders made sitting not too painful, but for all that, Sixx was glad to see the village come into sight shortly after they had passed the rocky defile. More from long habit of observation than anything else he had marked this place from the air, on the flight in. He had been curious as to why the planet's capital city, and the senior city of the entire Khandalar culture, was located in the heart of such rugged and inhospitable terrain. He had put it down to just one more example of feudalism . . . the safety-conscious

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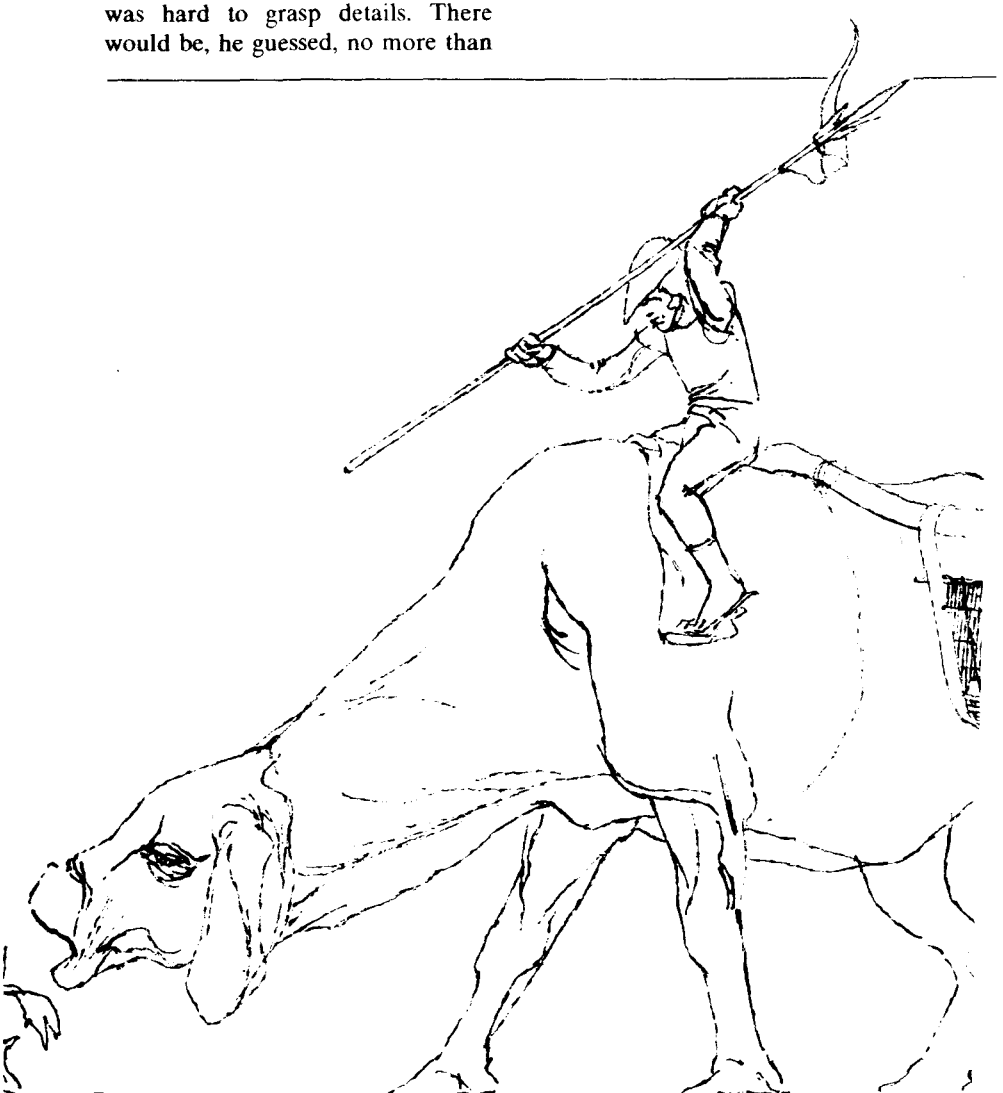
aloofness of the power-elite. At that time it had never occurred to him he might be making the trip back over this same terrain. Now he wished he had paid more attention, especially to the village.

In the rapidly approaching dusk it was hard to grasp details. There would be, he guessed, no more than five hundred inhabitants all told. What dwellings he could see were scattered, wooden, and low, but the inn was handsome and spacious.

"That's not so surprising," Lowry murmured, once they were seated in



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the gentle hat, each with a flagon of the local brew. "This place will be the logical stopover for anybody traveling between Casta and the east. Probably one of them best income-getters."

"I suppose." Sixx glanced over his shoulder to where Miss Stame was behaving with the innkeeper. "She's not so dumb, after all. Charge it, huh?"

"It will all show up in the bill, somehow, you can bet. I gather there

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is a garrison of a kind, here. You reckon we ought to report our little fracas?"

"Garrison? One noncom and five, and it'll be dark out in ten minutes. I don't think it would help anybody any. Here she comes now. I bet the locals don't know which to stare at the most, us, or her. That set of ribbons is just a waste of time. Not that I'm complaining, mind!"

She reached the table and sat, making futile sweeps with her arms to gather as much of her drifting finery as possible within some kind of decorum. "It's all fixed," she announced. "Fresh gracca in the morning, and two riders. Two rooms for us, and supper's on the way. I hope you won't mind if Quema eats right here at the table with us?"

"That's something we're going to have to get used to, I suppose. We can't start any earlier."

If nothing else, it was further entertainment for the locals, the sight of two I.S. uniforms, one dazzling Court lady, and one pop-eyed pet, all dining at the same table in their own inn. The more Sixx saw of the sorki the less he could see any charms about it. To him, a pet had to have some visible grace or beauty, like maybe a bird, or a cat, or even a snake . . . or some practical value, such as a hunting dog, or a horse. But this midget creature had no saving graces at all. It was somehow able to snuffle out food from its bowl and crunch on it without once getting caught up in its own incredible ears, and somehow without ever shifting that malevolent pop-eyed stare.

"You get the feeling the damn thing is staring at you all the time?" Sixx whispered to his partner.

"You, too? Must be the way its eyes stick out, either side."

"Well!" Miss Stame announced, at last. "I hope nobody minds, but I'm going to get out of this fancy dress in the morning. Right now, as a matter of fact. What I mean, it's very pretty and all that, but it's hardly practical!" She made futile swipes and tugs, achieving nothing. "I'll feel happier in someting a bit more civlized, frankly."

"I'd rather you didn't," Lowry spoke up, much to Sixx's surprise. "What I mean, I'd prefer it if you stayed dressed like that."

"Whatever for?" she demanded, and Sixx could have said the same.

"Well, all the time we're on planet, that dress is conspicuous. It's Court dress, and that counts for something. It's as good as an introduction. Look at the way it has swung things here, for instance. Once we're aboard our ship and space-borne, then it won't matter what you wear."

"Oh, well," she shrugged. "If you think it matters, very well. You're in charge, after all. Come, Quema, you've had enough!"

She collected her charge back into its box and departed, to take the sorki up to her room. Sixx eyed

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his massive friend critically.

"What was all that about?" he demanded. "This is the first time I ever knew you to worry about what anybody wears."

"Just what I said, Rex." Lowry looked innocent. "That fancy dress is identification just like our uniforms."

And you're a liar, Sixx thought, but he let it ride. Whatever game Roger was up to there would be some valid point to it. Meanwhile, he had a little work of two of his own. Some ten minutes later in the dim-lit low-ceilinged room appointed to them he bounced experimentally on the bed and found it respectably soft.

"I'm restless," announced. "I'll just stroll along and check up, see if our old friend is all bedded down safe. I can't be too careful."

It was a wild a moment after his partner left. It was extremely unlike Roger to be so transparently devious. Then dismissing it, he hauled off his right boot and unscrewed the heel, revealing a hollow cavity.

"Corny old gag," he murmured, to no one in particular, "but worth one more play." Undoing the front of his suit he retrieved the precious gem from his belt and stowed it carefully away in his heel. Then he placed the fake in the belt and put everything back the way it had been. He was just stretching out on his bed as Lowry returned.

"All safe and snug," he reported, "along at the other end of the passage from us." He inspected his wrist. "We'll be called at sun-up. That will be about six-thirty. No sense in wasting any of it."

He stretched himself out on his bed, just as he was, and prepared for sleep, leaving Sixx to wonder just a bit more what his colleague was up to. But not for very long. The I.S. uniform, so conspicuous in many ways, had many qualities that were not nearly so conspicuous. Apart from being virtually invulnerable to anything short of an ultra-high velocity steel-jacketed slug, or prolonged temperature in excess of two thousand degrees centigrade, it was designed for a man to be comfortable in, to live in for as much as seven consecutive days if necessary. So sleep was not too long in coming.

It departed much faster, almost instantly, at an urgent nudge on his shoulder and Lowry's grunt, "C'mon, Rex. Something's blown!"

"What?" Sixx was rolling up to his feet, snatching his helmet into place even as the question came. "What?"

"I put a body-bug in her room. It's howling now. C'mon! She's gone!"

V

They went, swift and silent, along the dark passage, seeing their way by the narrow spotlight beams from their helmets. The all-important door was shut and enigmatic, but the body-bug inside was still howling its message. Set to scream if the occupant went away and stayed away for more than ten minutes, Sixx could

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hear it himself, now that he had activated the circuit. There was no time for delicacy.

"Bust it!" he said, and the two together drew back and then launched forward. The door yielded explosively and they charged in. The far window was standing open. The curtains were torn, the bed ruffled. There were muddy footprints on the floor. Quema whistled furiously from her box. There was no time for wondering why "they" had snatched Miss Stame, rather than the precious pet.

"They can't be gone much more than ten minutes, Roger. We need transport, something fast . . . and we need to know which way."

"Whoever it was, they gave her time to dress." Lowry scanned the room. "And that means we know where she is. I bugged one of her sandals. Let's roust out the landlord. C'mon!"

They went down the rackety staircase making enough noise to waken the dead. And the innkeeper wasn't dead, he merely looked ready to die of fright as Lowry loomed hugely over him.

"Tell him, Rex. Tell him good!"

Sixx worked his tongue awkwardly around the alien sounds, enough to tell Mine Host that they needed two fast graccas, now! And that they were leaving the Royal sorki in his care, to be preserved from all harm, at whatever cost, until they returned. To emphasize the point, Lowry gave him a bleak stare, reached for a heavy pewter tankard from a shelf, held it in his left hand under the innkeeper's nose, and crushed it into squeaking ruin. Then they were outside in the chilly dark, with jewel-bright stars overhead and a stiff breeze whipping the innkeeper's nightshirt about his skinny knees. The graccas snorted and moved. There was a steep and stony path leading towards nearby hills, and in Sixx's ears now a repeated one-second tweeting that told him which way to go. They charged off, swaying, plunging and scrambling as their eyes gradually adjusted to the gloom, struggling to find the best compromise between the direction they wanted and the way the paths offered.

"You've been a busy little fellow, haven't you?" Sixx murmured, as they made some speed between high rock walls and the tweeting grew louder in his left ear. "Mind letting me in on your deliberations? Why in the name of sanity would anybody want to knock off bird-brain Elleen?"

"It figures," Lowry said, between bumps. "You and I, we both know what a very crafty character Jason Horn is, check?"

"All the way on that."

"So the Crown Stones are valuable, sure, but only as a symbol. One way or another, this culture is going to fall apart, no matter what, check?"

"I'm with you that far, too. You can't stop progress, not nohow, not once it starts. Whoa, I think we bear

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[illegible] and then left. That's not [illegible]. All right, then what?"

"Aside from the sorties as a smoke screen, as Jason M. Horn said. It's a rare and valuable animal, sure, but not so much as to bring the Old Man to oversee the way out here to oversee. So there has to be something else. And what else is there? What else is out there?"

"I've thought," Sixx admitted, [illegible] how to avoid an overhang. "But he awarded you a cigar and a blue ribbon. She's at all right [illegible] of royal." The measured sweep in his voice grew suddenly louder. "I think maybe we ought to slow down a little. Sounds as if we're right on top of [illegible] hah! Over there to the left. A light. Campfire?"

"Looks like it from here."

Both men checked their mounts, but now still to observe.

"Don't need the tracer now," Lowry murmured, touching his helmet to cancel it. Sixx matched him and released an infrared snoop visor to and his vision. He whistled softly.

"That's quite a party. You earned that cigar right enough. Somebody must think a hell of a lot of our Eleventh organize an operation this big. I'd say there were forty-five, maybe fifty of them, altogether."

"Backed up into a box canyon. Can't get much easier than that. Blackout, huh?"

"Check." Sixx agreed, slipping down from his mount and breaking open a pocket in his thigh. About three minutes later the pair of them were almost invisible inside a thin-film overall suit each. The film was sheer, tough, and with the handy property of passing light in one direction only, so that the man inside could see out, but no one could see in. Only their hands, and the soles of their boots were clear of it. The black-out suit could get a man very warm very fast in warm daylight, but in this darkness they wouldn't even feel it.

"You take the right-hand wall, I'll take the left. Watch out for the odd sentry, you never know. Somebody with brains laid this on."

"And who would that be?" Lowry wondered, "apart from Royalty?" He had groped through a slit in his suit and was now holding a slim and efficient needle gun in one hand while he made careful adjustments to his helmet with the other. Sixx, copying him, settled his helmet visor firmly, touched a switch.

"Read me?" he asked. "What d'you mean, Royalty?"

"I read. You know the social setup here as well as I do, Rex. What I mean is what Jason Horn said. You split a secret six ways and you might as well forget it altogether. This kind of secret, anyway. Maybe most of the Royals are crazy keen to be democratic, but I'll bet there are a few who don't fancy the notion at all, who have other ideas. Would you give up absolute power?"

Sixx started to climb, using his eyes warily. "I've never had it, so I

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wouldn't know. And I'm no idealist, so I can't imagine what kind of price would buy me. But suppose it is one of the Royalist brigade, possibly somebody away down in the hierarchy . . . all right . . . but why knock off birdbrain Elleen?"

"Who knows?" Lowry's voice came evenly, steadily. "Maybe for ransom. Maybe a bargaining lever. Maybe to lure us into a trap, even!"

"Now you tell me!" Sixx retorted, and froze as a rough-clad shape took form in the gloom and moved to lean over an edge and peer down. He saw the strange dark shadow much too late. The needle-gun made no noise at all as its solenoids sent a narcotic-laden dart zipping on its way. The shadowy man slumped slowly and lay still. Sixx climbed on.

"To lure us into a trap," he observed, "means that somebody knows far more than is good for him."

"That's what I said"—a pause—"bye-bye, friend. What I said. It has to be a Royal. It's too clever for anybody else. You'll notice those arrows all went where they were pointed, one to each rider, one for you, one for me . . . but none for her. And those laddies could shoot!"

"You have a nasty way of adding things up, Roger. But you are still not getting the answer I want. Why her? What's she got?"

He bore away to one side now and was able to overlook and see right down into the canyon where the bandits were assembled. There was enough firelight to make the infrared visor unnecessary, so he flipped it up out of the way and peered vainly across the dark gulf in an attempt to locate his partner.

"You set yet?" he demanded, and grew tense as the reply was slow to come back. "Roger? All right?"

"All right now. Had a hairy one there, for a while. There's a great back-up of loose rock and scree just here. One sneeze would be enough to bring the whole thing down. Might be handy, you never know. I've planted a cracker, anyway."

"It's a thought, but let's get her out before we start any landslides. Make a little flash for me, huh?" Sixx peeled back the hood of his suit and waited. He heard a sigh of effort.

"A minute!" Grunting noises. "Right. This is me. Where are you?"

Sixx caught just a wink of bright light, blinked his own headlight in response, then settled down to study the scene in more detail. A first urgent look had shown him that Miss Stame was in no immediate danger. The fire crackled well into the back of the canyon, not far from the wall where she was secured. Someone had thrown a rope over a high spur and the dangling end held her wrists high. Not painfully so, but high enough to make sure she couldn't do anything except stand there and watch while a motley group around the fire itself argued and squabbled over her clothes and jewelry. They had left her in something that looked, from here, like a very brief

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sleeveless vest. He guessed she would be feeling the chill night air a little, but that was a minor discomfort she would have to put up with for a while.

Questions bubbled up in one part of his mind while the other debated possible strategy. "They certainly don't seem to be treating her with any kind of respect," he murmured, "which must mean something. Seems you were right . . . either it's ransom . . . or bait to lure us into a trap."

"I make it thirty-eight, not counting the boss-man, sitting back there by the wall. See him?"

"Over here to my right, yes. We'd better save him, for possible questions. Meanwhile I suggest long-barrels and let's thin out the opposition a bit. You take all those on your side of the fire. I'll cover this side. But we leave that bunch actually by the fire, those slobs arguing over the loot, for later."

"Check. Two shots each, just to be sure. Go!"

Sixx squirmed, got out an extra six inches of rifled barrel from a leg-pouch, screwed it into place and started, deliberately but swiftly, to knock out all those he could see on his side of an imaginary line drawn from the fire out to the box-canyon exit. The needle-gun magazine was good for fifty rounds, and he had a spare clip if it proved necessary. The scene below grew rapidly more and more quiet, as if some strange hush was spreading over it, until the seven who squabbled noisily by the fire had to notice it. As did the solitary one whom Roger had called the boss-man. All at once, it seemed, their boasting self-assurance evaporated, the gaudy ribbons and glittering trinkets fell from their hands and they began to stare uneasily around. The boss-man stood. The others scrambled to their feet, too, anxious now.

"Like the clock that stops ticking." Sixx murmured. "You miss it, but you don't know just what . . . yet!"

"I'm all through, Rex."

"Check. It is now your cue to make a spectacular entrance that should just about scare the pants off them. I'll cover you. Down we go!"

Grasping the slim barrel he went hurriedly, but quietly, down the rugged slope, making for the fire, leaving it to Lowry to draw their attention. And he did in no uncertain fashion. What the uneasy bandits saw was a sudden puff of fire that thrust a slim red finger up into the dark. On the high end of that finger erupted an eye-blinding star that crackled and drifted and bathed the entire canyon in harsh glare. The shocked bandits cowered away from it, shielding their eyes, and then they saw, in the pitiless light, a monstrous, manshaped thing in shining white and glittering gold, with a glass window-pane in its head, come leaping lightly down the rocks, bounding from one ledge to another until it reached the valley floor and started

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pacing menacingly forward. The boss-man was first to shake off his stupor. Pointing with one hand, waving frantically with the other, he shouted,

"Shak! Shak!" But no "shak" came. Sixx cast a wary glance over the prostrate shadow-shapes, just in case, but the needles had done their work well, and there was no movement. It was left to the seven by the fire to shake off their fright and scramble to grab up their weapons, getting in each other's way and cursing, shoving, and still that fearful white figure came on. Sixx moved in silently from behind. One bandit got an arrow nocked, drew . . . and fell. Two more got as far as drawing . . . and fell. One, out of his mind with fear, dragged out his broad blade and charged . . . and fell. The flare was starting to burn out now. Sixx disposed of the other three then slid in closer still, in behind the boss-man, who no longer shouted "shak!" but stood as still as was possible considering his terror.

Lowry halted now, raised a hand to his helmet, and his voice came tinnily from amplification. "You all right, Miss Stame?"

Groping in the dark, Sixx found the other end of the rope that held her and jerked it free so that she staggered a moment and almost fell.

"I'm all right," she gasped. "I think. Is that . . . Mr. Lowry?"

"Right. Who's the character in the purple cloak? His name?"

"Sarpio, I think."

"Right. Tell him to kneel. Say if he doesn't I'll strike him dead, just like all the others."

Sixx peeled off his black-out suit swiftly and stowed it away as Sarpio fell promptly and abjectly to his knees. A second glare-white monster from his rear put the final touches to his demoralization. Sixx had intended that he should talk, and there was no difficulty with that, at all. The hard part was getting him to stop long enough for Miss Stame to have a chance to translate his babbling. And, after all that, it turned out to be nothing very much.

He was an old man, this Sarpio, gray and lean, a member of the Civil Service class. He was, he admitted, the chief revenue officer for the whole of the southern empire of Aldan, and would inevitably be put to death by Lagas for his part in this affair. He was so certain of that that he repeated it three times before he could go on to tell, dejectedly that, after all, he was only a small cog in a very big wheel, in a huge revolutionary movement. All three worlds were involved. Millions waited for the blessed day when Lagas and his clique would be overthrown. That would be the day!

In any language, no matter how alien, the phrases were old and shop-worn, sadly familiar. The courts were all corrupt. So were the administrations, on all three worlds. Soon they would fall. The rebels would come into their own, under a new and mighty leader, now in exile

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but ready and waiting to take over.

"And all the rest of that blah!" Sixx interrupted impatiently. "Get him off that track, will you? Let's get down to cases. Ask him why he picked on us, especially. That's the bit that matters."

It became a trifle more complicated now. "This is silly," Miss Stame declared. "but here's what he's saying anyway. The Tapesa . . . that's me . . . is well-known to be one of the hated outlanders hired by Royalty to ferret out and study the private and personal ways of the K-people so as to bind and crush them more severely than ever under the imperial yoke. Did she not flee from Loges to Aldan, and direct to Casta, to the Imperial Court? And is it not true that even now King-Emperor Lagas has sent for outlanders to take her safely away with her knowledge, so as to help prepare new and terrible ways of grinding down the helpless people? Our great Leader warned us that something like this would happen, that Lagas was working together with the outlanders. Lagas claims that the outlanders will bring great wisdom and knowledge to benefit all. This is a lie. Lagas will use the knowledge and the power for himself and his kind, for the Royals, so that they will be even more powerful than before . . . but that's all ridiculous!'" she interrupted herself. "I'm not doing anything like that at all!"

"So you say," Sixx told her. "And it doesn't cost me a thing to believe you, but you'd have a hard time convincing him. I'm not so sure that he isn't right, frankly, only it's none of my business. Good guessing, Roger. There's a brain back of all this. I'd love to know who, just to complete the record. Ask him, Miss Stame, if he will be so good as to put a name to this Leader of his. Go on!"

She made the necessary noises, and waited, but Sarpio was suddenly all done talking. His lined face settled into stubborn lines. Lowry sighed.

"He isn't going to talk, Rex. And we can't persuade him, either, you know that. He's already seen what we can do, and if that doesn't scare him, nothing will."

"I suppose!" Sixx admitted. "I'm not all that well up on torture, as it happens. And I'll bet the locals know a few tricks worse than anything we could dream up . . . and still he isn't going to spill it. But we have to have that name, if only in our own interests."

VI

It was a highly frustrating situation. Time was something they didn't have too much of, for one thing. But there was enough firelight on Sarpio's face to show that he was never going to talk, not under any kind of persuasion. For once, Sixx regretted his humanity.

Then Miss Stame said, "I'm cold. This nightdress is hardly the thing to wear . . ."

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"All right," Sixx growled at her. "We'll get back. There's enough light for you to dress by, but be quick. Not that that handful of ribbons will be much better than what you . . ."

"Here!" Lowry moved forward to grab. "Take hizzoner's cloak, that'll save you plenty of time and trouble, and he can spare it. I'll go round up a gracca for you."

She accepted the luxurious robe gratefully, swept it around herself, went to scoop up the bedraggled remains of her finery, and Sixx frowned. There had been that note again in Roger's voice. Something he had seen. But what? Sixx helped her with the tatters, and the cloak, gave her an arm up on to the gracca as Lowry brought it, and they started tramping quickly back along the way they had come . . . and all the way he was trying to puzzle out what it was he had missed.

When they reached their own patiently waiting mounts Lowry said, "We might as well fasten the door after us, make sure that bunch stay put until somebody comes to collect 'em. Like this!" and he touched a trigger stud in his chin-stay. There came a spit of light, a distant clap, and then a thunderous rumbling as a considerable section of the rocky canyon wall slid down into echoing stillness. "Take no chances!" Lowry said happily, and mounted up.

Breakfast was a busy time, what with the innkeeper fawning fearfully, dreading that the blotted reputation of his hospitality might get back to the Palace; with the local garrison to be rounded up and sent after the bandits; with Quema to be fed and soothed; with the litter to be seen to and new riders found, and with Miss Stame to wash up and change--this time with Lowry's approval--into something a bit more civilized. When he saw her in a floral tunic and pants that couldn't have fitted more closely if they had been painted on, Sixx was almost distracted away from his puzzle, but not quite. As soon as they were once more jogging steadily on their way, with two sturdy peasants riding the lead graccas, and the coast and Padash no more than forty miles ahead, he decided to surrender.

"Let's have it," he said. "What was the big idea behind stealing the tax-gatherer's garment, Roger?"

"Oh, that!" Lowry, seated again on the far side of Miss Stame, stretched a long arm back into the pile of baggage and retrieved the garment in question. "Just a guess, maybe. I never yet heard of any rebellion, or widespread conspiracy, or out-group of any kind, that didn't have some kind of emblem, or trademark, or symbol of some kind. Especially the officers and sub-leaders. How else can they get it across to the rank-and-file that they have the true voice of the Cause?" He was examining the cloak as he talked. "It would have to be, though, something a man could conceal, something he could shed real fast if it was dangerous for him to be seen wearing it.

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And the cloak seemed to me to be the best bet. Do you suppose that's it?"

He held the cloak now so as to expose an area that would, in wear, be underneath the right lapel-edge. There tacked on with small stitching was a blazon. It was oval, the size of a man's palm, and black, with a design embroidered on it in red and yellow. Sixx drew it close.

"Two crescent moons, one either side," he murmured, "with a dagger between them pointed downward. That much is plain. But that squiggle in the center has me stopped. All that gibberish. What's it mean?"

"Nothing," Lowry denied. "Here!"

"Of course. Sorry it's early and we had a rough night. Elleen, sweetheart, what's this?"

"A Royal crest," she said, and stopped there, looking at it. He looked at her so close, so flawlessly beautiful, so stupid! He strove for some measure of patience.

"A Royal crest. Good. *Which* Royal crest?"

"Loges South."

"How do you know that?" he demanded, inwardly.

"Aldar is a dagger and two crescents. Metera is two crescents and a dagger. This is Loges, with the crescents either side. The dagger pointing down is Loges South. If it had been up it would be Loges North."

"All right!" he said. "Good. And now what's this squiggle mean?"

"That is Lorian."

"And who pray is Lorian?"

"Lorian is the third son of Teltor, who is the second eldest brother of Rimas, who is the King of Loges South."

"Now we're getting it," he sighed. "Please tell me everything you know about Lorian?"

Her face had gone blankly still from the moment of his first question. It was still dream-calm now as she started to talk.

"Lorian-dis-Teltor. Born Twenty sixty. Sent to Earth to complete his education, Twenty seventy-six. Reported good to excellent in technology, administration and management, history, socio-economics. There were disturbing reports and rumors in Twenty seventy-nine of unofficial and unorthodox activities, and he was recalled to Khandalar in Twenty eighty but failed to return. His present whereabouts are not known."

"Sounds like our boy, all right. Do you have a physical description?"

"I'm sorry, I do not have that information."

"Let's not be greedy, shall we? You did very well." And he meant it. But he couldn't resist just one more question. "What does Tapesa mean?"

"It means . . ." she started, and then blinked out of her semidaze and turned angry blue eyes on him. "I am not going to translate that! Fat and overdeveloped, indeed! Do you think I'm fat and overdeveloped?"

"By Khandalar standards maybe you are," he chuckled. "But by me

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you are just about perfect. I can forgive you all the other things."

"All what other things?" she demanded.

"Never mind. You did very well. Thank you. You guessed pretty good, Roger. Now we know just who the great Leader is."

"A computer could've done it, near enough," Lowry disclaimed. "Just logic, is all. They may think they want to overthrow the Royals, but leaders come from a certain class of people, a certain way of thinking, and Royals have been breeding that type for generations. It figured. It had to be one of them."

"You make it all sound so easy." Sixx brought his attention back to Miss Stame. "How come you know all that stuff?" he asked her. "And already translated into Earth values like that?"

"Dr. McLaren asked me to do it. To read up all the records, all the family lines and histories and all that. He said it might be useful. And, of course, it's exactly the kind of thing I had been doing before."

"That's right," he said. "So it is. All that stuff about longevity. I suppose it's all part of the pattern, for you. But very handy for us. Now *we* have something to report, if it should ever come to that. It's always useful to know who the opposition is." He settled back into a more comfortable position on the litter, and she stirred restlessly.

"All *what* other things?" she demanded again.

"Forget about that. Let's talk about something else. About you. What will you do with yourself when you get back to Earth?"

"I don't know," she confessed. "I really don't know anything, much."

"You could always set up shop as the authority on Royal sorkis."

"I couldn't." She made a face. "That would be no good."

"Why not? You've learned all there is to know about them."

"It's not like that!" she wailed, in real distress now. "You have to ask me the right questions. I mean . . . I can ask myself some, like 'what should she eat?' and I know the answer. How long should she rest? How much exercise? And stuff like that. It's routine. But I don't really know how to ask the hard questions. And I need to. She's sick. Right now! There's something all wrong with her. And I don't know what. And I don't know which questions to ask myself, either!"

"Oh, brother!" Sixx sat up again, tried to scratch his head and wasted the effort on the outside of his helmet. Obvious-type questions wouldn't work, obviously. A word of Lowry's came back in the shape of inspiration. Computer. Ask that kind of question.

"Is it something she ate or drank?"

"No, positively."

"Knock, bruise, sprain, bump, jar or other injury sustained while in transport or being moved from place to place?"

"No, positively."

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"How can you be so sure of that?" Sixx asked.

"Because it has been coming on for more than two weeks now, at least two weeks, perhaps longer."

"And you were the expert, so you couldn't ask anyone else. Great!" He searched his mind for another angle of approach. "Symptoms? No, cancel. What do the available symptoms indicate, to you?"

He expected a negative, and was surprised. "Pregnancy," she said. "But that is flatly impossible!"

"How . . . impossible?"

"Because there is only the one male sorki in Casta, the Royal Male Mooli . . . and Quema hasn't been anywhere near him in months, certainly not since her whelping. Positive!"

"I give up." Sixx sighed. "At any rate it isn't urgent. Is it?"

"I don't know. The normal pregnancy pattern is all I have to go by, and on that basis the event won't become urgent for another two weeks or so."

"We'll just have to hope along those lines. At least it will get us aboard the Clipper, where we will be secure. And then off-planet. Two weeks!" He did desperate calculations in his mind. By the tourist route, assuming no further hazards or emergencies, they might . . . just make it to Armstrong Base in time. His imagination led him off into chill contemplation of the awful possible alternatives, so that he only half-heard the dialogue that followed on, between Elleen and Lowry.

"I can understand," the agent offered, "how you could *remember* the K-language straight off, but how did you come to be able to speak it so well?"

"Oh, that was easy. Uncle Bernard had a tape-collection on it. Sets of words in Khandalar, with Anglic equivalent right after. All I had to do was listen to them a time or two."

"You didn't have to practice, with a tape-machine?"

"No. I can get it, straight off. Why?"

"I just wondered whether you had ever listened to yourself on tape."

"I never have. Isn't that funny?"

Padash was more than a village, but not quite a city, and thus a fairly typical Khandalar seaport. Barnlike store sheds lined the seafront, the streets were lively with busy merchants, and steeple-high ships dotted the quiet blue waters of the harbor. Earth's share of the splash-port traffic was based a long mile outside the town walls to the south, with concrete-block buildings, and massive half-hoop floating docks surging alongside, ready to chug out and grapple a ship once it had come down in the sea out there.

"How to arrive at a compromise," Sixx pointed out, as their baggage was being moved to a hydrofoil, ready to skim it and them out to where their own ship rested. "We can't use the K-drive in our ships,

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even if we knew how to make it work. It involves some kind of oscillating magnetic field effect, and that would shake all our instrumentation into junk in jig time. And it would foul up the Pauli-drive. So we still use impulse-power . . . jets . . . for close-in planetary work—for those we prefer, land-and-launch pads. But the K-people have a thing about wasting good land by smothering it in concrete. Their ships can sit down in the sea like a bird, so they don't bother with landing sites. We have to go along with that. Our pilots have to learn a new technique, how to tail-down into the sea and stay upright until the collars can take hold. And it works. And it is such a good idea that it is beginning to catch on back home, too. Which goes to show that ideas can diffuse both ways. But that K-drive is really something. One of these days our experts will crack it."

"I don't understand that part," she confessed, as they went down into the hydrofoil. "I mean, if this culture had interplanetary travel that long ago, while our ancestors were still wearing skins, why didn't they go on to interstellar travel, like we did?"

"Hindsight is a great thing," Lowry murmured. "It's easy to forget that *we* were stuck with the rocket-thrust notion for almost a century. Just because it worked. When you know how . . . when you think you know the only way how . . . it can be kind of difficult to throw it away and try for something different, to think into a new pattern. It was hard for us. It was impossible for the K-people until they saw our ships, until they saw that it could be done. Now you find Khandalar crewmen all over the place, learning the tricks. And some of them are pretty good, too. From what I hear, there are more than a few K-engineers by now. We're right there."

Miss Stame peered, and looked disappointed. "Small, isn't it?"

"And ugly, too," Sixx chuckled. "No need to be tactful, sweetheart. The Clipper isn't meant to *look* pretty, but, like these uniforms of ours, she packs quite a lot of talent. I'm going to feel a whole lot easier in my mind once we are aboard and buttoned up."

To her mild surprise neither of them made any move to enter the ship until all their baggage had been off-loaded onto the weathered surface of the docking-girdle, and the hydrofoil was safely away, heading back inshore. Only then did Sixx position himself in front of the hatch.

"All right, Joe," he said. "Open her up. We're home!"

With only a moment for the sensor mechanisms inside to scan their record banks and compare, the hatch began to wheel open and eject a telescopic gangway. Miss Stame stared. Sixx grinned but offered no explanation. There were things it was better that outsiders shouldn't know. For instance that the computer, familiarly called Joe, *was* the ship, in effect, and that it was programmed

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to have nothing whatever to do with anyone at all except himself and Lowry. Some unsung wag back in I.S. research had coined the acronym Comparator-Loop Integrated Personality-Profile Examiner and Recorder . . . and the Clipper Ships it had been, from then on. Sixx patted the gangway affectionately.

"On in!" he said to her briskly. "Make yourself at home. Be our guest." And she was not to know that the key word was noted and filed, that Joe would extend to her the facilities proper to a guest, but nothing more. It was a very useful arrangement. Even in the unlikely event that undesirable intruders got into the ship, there wasn't a lot they could do with it, or that it would do for them in return. He grabbed Quema's box and followed, pointing her dead ahead to the lounge-space, which was spacious enough, and comfortable, in a well-worn way.

"Cook-nook over there," he pointed, "with a standard auto-chef. The wash-up facilities are right next to it. There's the bar. You just stay here and worry about Quema while we get the stuff unloaded and stowed. We'll show you your cabin later. Right now we have a lot to do, but we can manage it a lot faster on our own. You just take it easy."

Quema came out of her box and started snuffing suspiciously around this new environment. Sixx eyed her dubiously. She certainly was bloated around the girth. He had a momentary inner flash of what it could mean if they landed back home with one highly precious Royal pet . . . improperly gravid. He shoved the awful thought hastily away, but his common sense assured him it would have to be dealt with sometime. And soon, by the look of that bulge.

VII

Fifteen strenuous minutes later he came back to her, where she sat disconsolately on the long couch. If only she didn't look so delectable, he thought, it would make life a lot easier. He composed his thoughts.

"There are things you need to know, Elleen," he said, "so listen. Up top, Roger is busy checking us into a flight-caravan. If we were on our own, we would stay suited, lift-off and jet out to the C.G.I. limit . . . that's the critical gravitational intensity limit, as I expect you know, and the Pauli-drive won't work inside it . . . and then we would warp-out direct for Sol, and Luna Base—on our own power. But that is quite a rough experience. A small warp-unit gives a bumpy ride. Nothing can be done about that. It's a function of size and field-strength, the involved stresses. It's something like trying to push a rowboat at forty knots over a big sea. It's not nice. *We* could do it, and have done, lots of times, because our suits have built-in mechanisms that help ease the shocks. And we could be home in something like thirty hours. But, the way things are, that's out. We have you to think

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about—and her. So we have to take the tourist route, like it or not. And that is a different scene altogether. How much do you already know about that? You must have come out here by tourist . . .?"

"Yes," she admitted. "Uncle Bernard gave me a run-through on it, but I didn't understand any of it, not much. You have a warp-master ship, and all the other ships cluster around, and get grappled up . . . and then the warp-master ship puts out a big field, and they all go together."

"That's good enough to pass."

"Uncle Bernard said it was like in the old days when they had steam-trains on rails, and one carriage was all engine and pulled all the others along with it. Whatever that might mean. What's a steam-train?"

"Never mind that now. Ask Joe, sometime. Point is, we'll have a comfortable ride, but slow. We may have to wait a while before takeoff, until a cluster is made up. Then we'll make stops. With a lot of luck we should raise Sol inside two weeks. Meantime we do nothing except sit tight and be careful."

"Careful?" She frowned at him. "What could happen, in space?"

"I don't know. Anything . . . or nothing. This," he touched the glitter-gold I.S. insignia on his arm, "means Security . . . only because we make it that way. We take no chances. At all! So listen. Once we are under the warp-master we will be inside a small self-contained universe all our own. You could step out of the ship and drift around if you wanted to. People do. They get a kick out of it—like being able to fly; to go visiting other ships. To play far-out games with a ball. Stuff like that. Maybe we'll be able to watch some. But we won't join in. This ship stays sealed, and you and Quema stay inside. Got that? We've had plenty of shocks already, just getting this far."

Protest began to register on her face but before she could voice it Lowry came tramping in. He had already de-suited down to a close-fitting dark jersey-knit one-piece and managed to look even more massive than ever in it.

"Maybe our luck has changed," he announced. "There's a warper up there in orbit right now, making up a cluster, and he should have room for us. Due out in an hour. Three stops. One small one, almost local, then Polaris, and Vega, and home. I've registered us in there."

"That's fine. Roger. Look, show Elleen her cabin and stuff, while I get out of this monkey suit and get freshened up. Soon as we're in warp we'll let Joe take a look at Quema. Maybe he can come up with something."

"Joe?" Her eyes were wide again.

"That's our computer. He's not nearly as pretty as you are, but he is a whole lot smarter, you'll see."

Getting into warp-train was nothing at all. At the "ready" signal from

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the Clipper shore-control obligingly parted the girdle-docking and Sixx stood the lumpy little ship on a tail of fire and steam and took it straight up into the blue following a marker-beam. Miss Stamic, highly privileged, sat in the spare chair between the two men, in the control room, and watched the land and sea fall away, to become a bowl . . . and then a pulge as the horizon sank down . . . and the bright blue sky faded slowly into indigo and then black, pinpointed with stars. It looked like the easiest thing in the world to do, especially when Sixx moved one small lever and sat back.

"Nice ride, Joe," he said. "Now go find them, boy. He's not far away." He swiveled to her curiously. "If I'm guessing right, you're the sort that has to see anything and everything new at least once. So . . . did you go aboard the warp-master, on your way out?"

"I wanted to," she admitted, "but there wasn't time before we actually went into warp, and then . . . well Uncle Bernard took me part of the way, but when everything started getting fuzzy and molten, I got scared, and we came back on board our ship again."

"You don't have to apologize for anything," Lowry soothed her. "I tried that stunt once, and it scared the pants off me, too. Funny thing is, it has no effect at all on some people—like being tone deaf, or color-blind, I suppose. They just haven't got whatever it is."

"I learned the theory of it, once," she said. "The Pauli-drive generator creates a partial-reality field that is at variance with the possible states of real-time matter-energy. By a process of virtually instantaneously selecting and rejecting possible co-ordinates it enables anything within the field to evade the limitations and restrictions that are inherent in the Einsteinean space-time framework—"

"And so on," Sixx interrupted, grinning. "Don't tell me you don't know what it means. You don't have to. I doubt if anybody else does, either. All that matters to us is that it works, that somehow it manages to winkle a way in between the real stuff. But it's that split-second selection and rejection that does the damage. I've heard the theory boys talk about subjective sensory frequencies, whatever they may be. All I know is what you said, that things go fuzzy around the edges and you don't know which way is up any more. Breakdown of reality, they call it. I'm told that a drug-trip turns on the same kind of nightmare sometimes. Yet some people are completely immune, just as Roger said. And they are the warp-masters. That's a hierarchy that McLaren didn't think of—an elite, chosen by the machine. No others need apply. And there he is, now."

He reached out to cancel a plaintive bleating from the panel, and wound up the magnification until the warp-ship was a discernible object in

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the screen. It was nothing at all to look at, just a massive dark hull, squashed-orange shape, about a hundred meters through at the major axis, with no protuberances at all to interrupt the outline of its twenty-meter thick skin. Not until they were comparatively close could they see the small bosses that were the grapple-cable roots. One came snaking out to meet them now. Other cables were already holding ships securely in small orbit about the master. The radio hummed suddenly.

"Warp-master to Clipper IV. Accept my grapple and stabilize, please."

"Clipper to warp-master. Come ahead with the grapple. We are stable." Seconds later there came the clack through the hull of the magnets striking home, and Sixx was able to add. "Contact. It's all yours."

"Thank you, Clipper IV. Warp-out in seven minutes. Our next dewarp will be in six hours seventeen minutes. There will be a thirty-minute warning."

"And that's all there is to that," Sixx announced, punching the figures into his panel. "We have a little under six hours, and some spoiled sleep to catch up on, but as it's a long while since breakfast, I suggest we eat first. If I may have your orders, ladies and gents, I claim to be one of the best auto-chef handlers in the business. What'll it be?"

"I ought to do that," she protested.

"Oh no you don't." Lowry touched her arm. "You have something else to do. I'm going to show you how to talk to Joe. We have questions to ask him. You give us a buzz when you have the table laid, Rex."

Fifteen minutes later, with the split-second twist of warp long past, the table spread and the platters hot from the machine, Sixx saw the other two appear, Lowry with a slow grin, Miss Stame looking downcast.

"The Royal lady is undeniably gravid," Lowry announced. "Joe settled it without turning a circuit."

"How come?"

"Simple logic. When you get an impossible answer you have a wrong datum there some place. So we checked, and found it. Item . . . the Royal sorki is not . . . repeat *not* . . . a different species from the common, or wild, bassorki: it is just a highly selected artificial breed. And the Palace and grounds are thick with the wild ones, the common stock. So that's it!"

"That's not it!" Miss Stame wailed, threatening to weep into her meal. "Oh, it's the right answer, yes. But now I don't know anything at all. There isn't a thing in all the records about the bassorki, apart from the name. And nothing at all about crossbreeding, either. I don't even know whether Quema can deliver crossbred whelps, or how many, or when . . . or anything!"

Sixx stared at her, and then at Quema, who had her muzzle deep in

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a bowl of crunchy bits but was still able to create the illusion of staring straight at him balefully. And she seemed to be bulging more than ever now. He moved his gaze to Lowry.

"We really drew one, this time," he sighed. "To quote our illustrious superior, Mr. Jason blasted Horn, 'We U.F.S. have never yet lost a consignment. We always deliver.' Oh how I wish that he were here to eat those words, plus a few well-chosen ones from me!"

Miss Stame began to howl loudly. Lowry patted her shoulder.

"Don't you worry none," he soothed. "It's going to be all right. Nature has a way with such things."

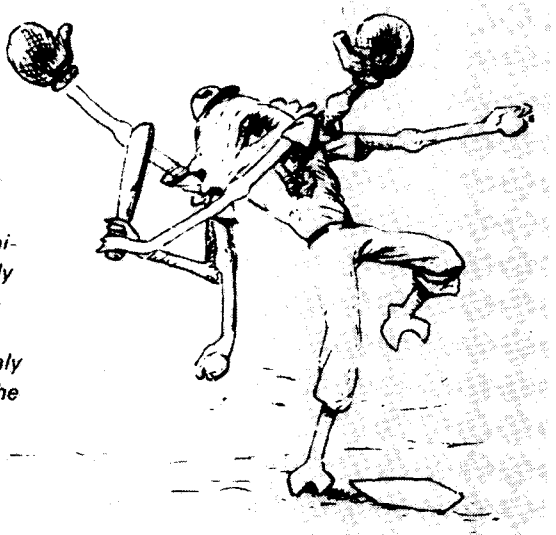
"Hark at you!" Sixx snorted. "You realize, don't you, that even if that pop-eyed female manages to deliver . . . hah! Deliver! There's a word! . . . even if she manages that, and survives, we are going to be stuck with the offspring! How will we explain them?"

TO BE CONCLUDED

DEPARTMENT OF DIVERSE DATA

***ARTROSPORTUS VIRIDIS SAPIENS* or "GREENSOX" (GREENIE)**

E.T. from Mars (Dominant Species). Highly civilized. Most adaptable to human customs. Has tried vainly for recognition by the Major Terrestrial Leagues.



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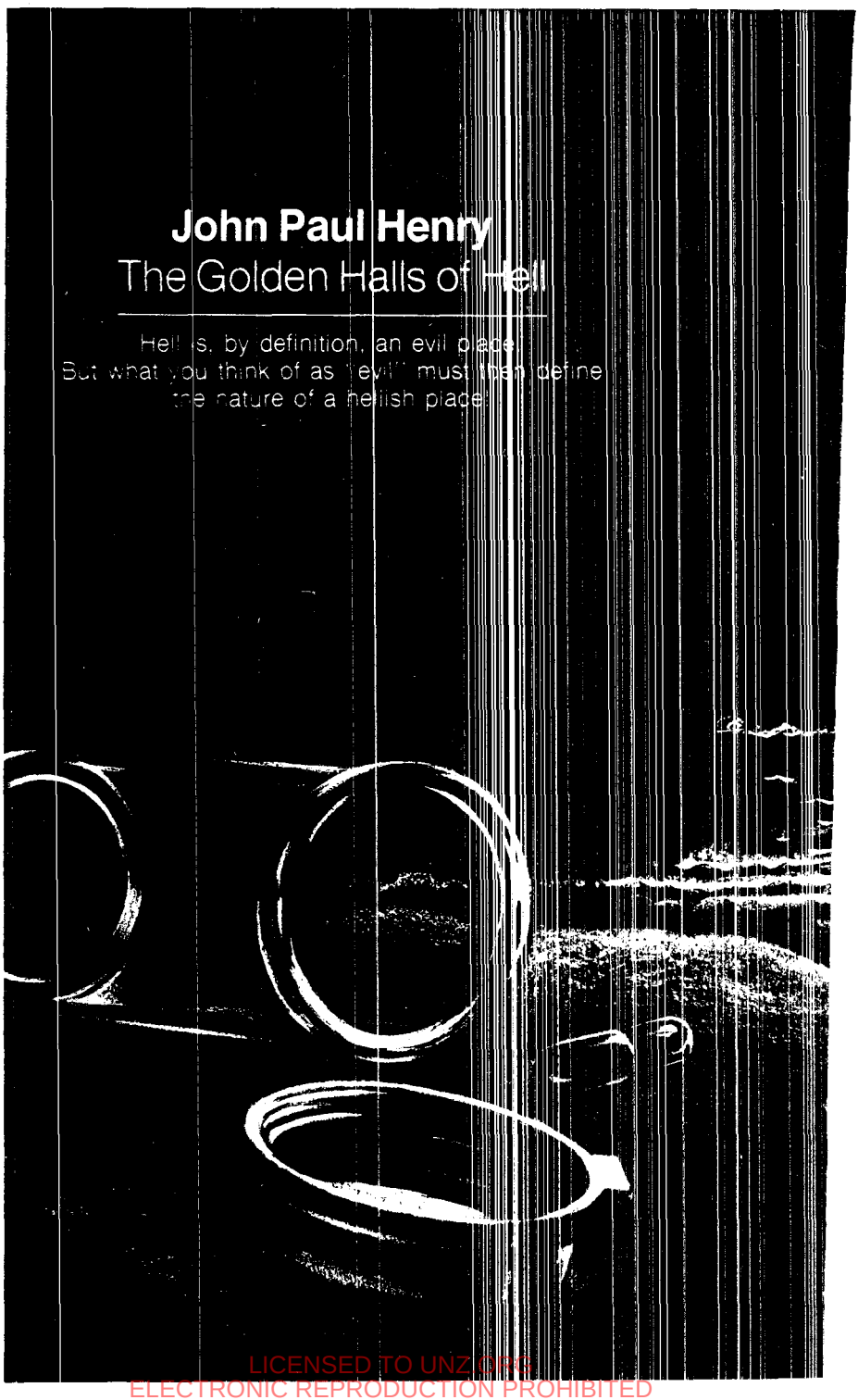
John Paul Henry
The Golden Halls of Hell
Hell is, by definition, an evil place.
But what you think of as "evil" must then define
the nature of a hellish place!

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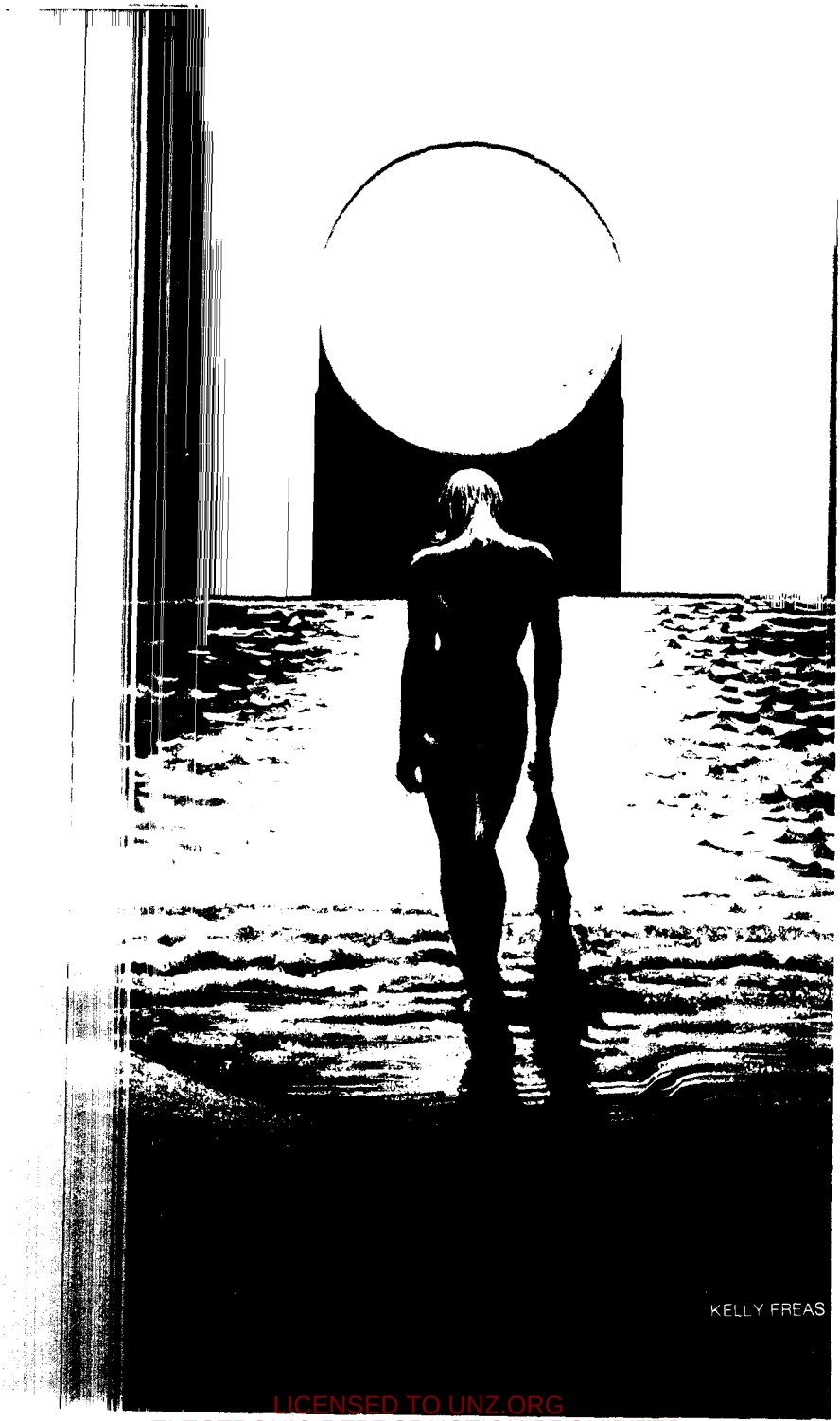

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She had worked out how she would die. By drowning. She had established all the alibis. For several weeks she had been walking down to the little beach at the end of the road, at six o'clock in the morning, had left her towel, sunglasses and rubber slippers on the sand, and taken a swim in the surf.

At 6:30 she had walked back, wet and glistening in the sunrise, and had been seen by all the early walkers and window openers along Bay View Road.

She had catered for the "I-told-you-so" experts. Several of her acquaintances—she had no friends—had taken the trouble to tell her when they met in shops that one should never swim alone in the sea around San Sebastien. She had smiled and said, "But I never go out deep," and they had shaken their heads doubtfully. How knowingly they would shake their heads when the news broke.

She had prepared it all. When, one morning—tomorrow?—the towel and the slippers and the sunglasses were found on the sand, everyone would recognize exactly what had happened. With luck, her body would be taken by a shark. If not, it would be so bloated by the time it drifted ashore, that no one would think of a postmortem examination.

For she was not going to do it the hard way. Life had been hard enough and in death, she felt, she had earned a little luxury. She had forty-eight barbiturate tablets carefully accumulated from different doctors on different islands over a year, and when she walked down to the beach for the last time, in the night—not in the early morning as everyone would think—she was going to sit in the dark on the sand and swallow these pills—remember to take a paper cup with something to drink—and wait for them to start to take effect, so that when she swam out at last into the warm, black sea, her soft, treacherous body could not disobey her stronger mind and turn in that black water to claw its pathetic, hopeful way back to shore.

Felicity had it all planned. She went over the plan and it was good.

That is why, that evening, she sat in the little pink box of a concrete house in the upper reaches of Bay View Road, between a blue house and a green one, playing two-pack solitaire for the umpteenth time.

The weekend letters to Christine and John and Paul were already written and waiting to be posted on Monday—full of gay plans for the coming holidays. Further proof of no suicide. The empty can of beans in the bin proved that she had had supper normally. She even left the dirty pan soaking in the sink, though she emptied the warm beans down the loo. It was just too much effort to eat. She would leave no will—but what did that matter? Nothing in the world belonged to her but a few clothes and some grudging gifts of jewelry, bought in parts of the world where jewelry is cheap.

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Felicity listened to the usual night noises of San Sebastien. The moan and roar of the sugar factory, the tortured braying of donkeys, the dog fights and the yowling cats. She wasn't interested in the sounds at all; she was interested in . . . was it going to rain?

She peered through the slatted windows that turned the pink box into a mental rat-cage and tried to see if the stars were clear. They were. She looked at her watch. Only ten o'clock. In half an hour she would switch off the beastly little gilt lights and go to her bedroom, as usual. She would undress and wait in the dark until two or three in the morning, when even the dogs on San Sebastien slept. Then, if the weather was fine she would slip into her costume and slippers and walk quietly down the road.

If it looked like rain, rain that would soak the little toweling pile on the beach and might cast a mild doubt on the accidental nature of her death, then she would go to sleep in bed and live through another day or two, or three. She had lived through some . . . fourteen thousand? . . . already. A few more wouldn't make any difference.

The game of solitaire came out successfully, as it too often did. Felicity shuffled the packs, ready to deal again.

Then, up the road, came the sound of someone running. Bare feet on the tarmac, and now a gasping breath. A chorus of barks broke out indignantly. The neighbor's German shepherd dog, poor half-starved thing, growled and sprang at the garden fence and bayed like a demented soul.

Felicity heard the squeak of the wrought-iron gate that guarded her ragged garden and hideous porch. Then the footsteps slapped once and the front door was flung open. A man stood there, wild and trembling, with his hair and beard a mess. The German shepherd flung himself at the garden wall and scrabbled in a cacophony of barking.

The man jumped inside the door and pushed it to behind him and stood there, staring at Felicity. He was youngish, white, bearded and unhealthy-looking. Long, loose clothes fell airily to his feet. Felicity put him down as a Hippie of the harmless kind. Then he pointed a long, quavering finger at her and panted, "Take me to the King!"

Felicity was alone and naked except for a long, loose housecoat that brushed her neck and kept the mosquitoes off her ankles. She was white in an anti-white town. Probably no one would come if she screamed, but she wasn't in the least frightened. She had a job to do, and if some little nut wanted to interfere he could buzz off, that was all.

"This is 41 Bayview Road," she said slowly and clearly. "You've got the wrong house. Where do you want to be?"

"Mistress," he said, "where is thy

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husband? I bring tidings of great import. I must go to the King."

"My husband's away," Felicity said, "in Barbados. You've come to the wrong house. Do you want the Bay View Hotel? Or are you off a ship?"

He wasn't listening. He was looking all round the room as if he'd never been in a room before, taking in the peeling floor tiles, the smeared, bright walls, the plastic chairs, the gilt lights and gold stars on the ceiling.

"What is this place?" he asked suddenly. The lights seemed to fascinate him. He kept staring at them in turn. There was even a small, damaged chandelier.

"This is 41 Bayview Road," Felicity repeated, clearly and carefully, still holding the two-pack cards in her hands, still sitting at the flowery table. "The hotel is farther down, on the left near the sea."

Then suddenly he crumbled. He looked at the chandelier again, where the electric bulb leered drunkenly behind the missing drops of glass. His face melted and his little mouth twisted under the thin beard. He stumbled forward a couple of steps and caught hold of the back of a chair.

"This is not Ashby?" he asked brokenly.

"This is Charlotte Town, San Sebastien, West Indies," Felicity said, rather grimly. Why was she always a magnet for the unfortunate, the troubled, the insane? Would psychiatrists say she welcomed other peoples' misfortunes as a distraction from her own?

The little nut put his head in his hands and wept like a child.

"You need a drink," Felicity said, and got up. She pushed him firmly into the chair, went to the kitchen and drowned two jiggers of rum in soda. If he was a Love Child he might object to naked alcohol.

"Drink this," she said, forcing it on him, and he obeyed, little-boy like, spluttering and weeping and making quite a mess into his beard.

She gave him a Kleenex and slipped into the bedroom. A long housecoat over nothing is a bad basis for decision-making and this Hippie obviously had to be dealt with. She put on the shirt and shorts that she'd worn before having a shower.

When she got back into the sitting room, moments later, the man had finished the rum and mopped himself up a bit and turned his large, bulging, wet, brown eyes towards her.

"Well, now—" Felicity began briskly, but up came the bony forefinger and the Hippie sprang to his feet.

"Jezebel!" he hissed. "Wanton!"

Felicity's jaw dropped.

He clasped his hands together, raised his eyes, shut them and started to mutter rapidly. He was *praying*. She distinctly heard the words, "Lord deliver us . . ." and ". . . lustful women . . ."

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Felicity stood there, bare-legged, outraged and indignant. This was Wales not the Trucial States and anyway she was in her own house.

She took a stride towards him, but the start of shivering and his prayers increased so frantically that she thought the neighbors might hear.

It was easier to give up. Felicity went back to her bedroom and came out with her housecoat buttoned over her shorts and shirt. "Is that better?" she asked acidly.

He simmered down and sat down, and the rum started to bring some color into the quivering white cheeks.

"Look," Felicity said, "it's late, and you can't stay here. Where are the rest of your Group?"

He stared at her.

"Where are your friends?" she asked. "I'll ring them up and get them to collect you. Where do you come from?"

The rum really was taking effect. Perhaps she shouldn't have made it so strong. His eyes went quite round and his hair fairly bristled and he raised that bony forefinger like Merlin prophesying Doom.

"Mistress," he hissed, "I come from the Golden Halls of Hell."

Oh God-why-does-it-always-have-to-be-me! she thought again, as the stars twinkled brightly through the rat-cage windows. What must she do? There was no mental asylum on San Sebastien, and of the two doctors one would not come out at night except for politicians, and the other was in Antigua for the week. The hospital? Could she persuade a little night-nurse Junior to accept this dubious little twit—even if he agreed to go there?

He was muttering to himself ". . . Devils . . . great light. . . . deep magics. To me it has been revealed. I was chosen to warn men while yet there is time . . ." He blinked. "Is there time?" he asked suddenly and lucidly. "What year is this, Mistress?"

"1971." Felicity snapped. He must be a worse case than she had thought.

"Nineteen . . . seventy . . . one," he repeated the words like some astounding, new piece of information, writing them with that forefinger on the golden flowers of the repulsive table. "Nineteen . . . seventy . . . one. Oh Lord, forgive me my transgression!" and the poor little manling once more melted and dissolved and shrank into his hairy self and blubbered like a four-year-old, rocking to and fro. "Have pity on me," he kept whispering. "Mercy, oh Lord."

Felicity looked at her watch. It was well past eleven now, and a perfect night for the suicide. But what could she do with the Hippie? She had no friends to telephone for help. If she turned him out on the street, he might fill himself up with dope that would fight with the alcohol and either knock him out, or make him dangerous. The last thing Felicity wanted to do was to get involved in a

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court case where she might be called as a witness or anything . . .

She looked at the poor, shaking, pathetic little creature and suddenly put her hand on his shoulder. He was flaming hot. Temperature about 102, if Felicity's experience with children was anything to go by. She made up her mind.

"Look," she said, "would you like to spend the night here? Then we can sort everything out in the morning." Next day was Sunday. She could turn him over to Father Delaney at the Episcopalian Church. Father Delaney adored having white members in his congregation. He might even consider this poor specimen an asset. Anyway, he would have contacts and know how to get rid of him kindly.

The Hippy gave her the wettest look of noncomprehension she had ever seen.

"Come on," Felicity said firmly and propelled him across the floor towards George's bedroom. The bed was made up.

"You can lie down on this bed and sleep," she said. "Here are some pajamas."

She wound open the slatted windows, cursing when she saw how clear the night was. The Hippy stood quite still at the foot of the bed. He was shivering, and a few insects were buzzing round.

"Put these pajamas on," Felicity said in a nanny-bullying tone. "Get your clothes off, and you'll be more comfortable."

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He was wearing a long, feminine catsuit that shimmered faintly and moved around him with a gentle, attractive sort of independence.

"How d'you undo this thing?" Felicity asked. It was messy with rum and coke and didn't appear to have a zipp.

The message got through. He clawed at his front and the suit parted, revealing a hollow white chest decorated by a few long, black hairs.

Felicity went into the kitchen to set up and light a green mosquito coil and for good measure she crumbled two aspirins into a glass of powdered milk.

When she got back into the bedroom, the Hippy had clambered into the pajamas and was actually getting into bed, sensibly. He drank his milk like a baby and indicated that he wanted the windows shut.

There was only one more mild outburst that night. When he sniffed the mosquito coil, the little nut stiffened till his joints creaked. "*Incense*? Art thou a papist, Woman?"

"Nonsense," Felicity said. "That's not incense, that's a good Chinese remedy for keeping the mosquitoes away. Go to sleep," and she rammed him down firmly on the pillow as if he were John or Paul ten years before. "Go to sleep," she repeated. "You're ill. You've got a fever. We'll talk about things in the morning."

She clicked off the light in a purposeful way, and from the dark bed

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came the first sensible remarks of the evening.

"Thou art kind, Mistress," he murmured in the quasi-Elizabethan that he seemed to favor. Obviously he *liked* being bullied. Some men do. Then he went on in rapid, everyday American, like a child repeating a lesson. "No fear of a virus infection. What I got is hyper-culture-shark."

Felicity went back to the table and picked up the playing cards and considered the position:

1. She had a nut on her hands.
2. He was some sort of avidly religious nut.
3. He was sick.
4. He said he was suffering from culture-shark. Culture shock or Cultural Shock. Felicity had heard the phrase from Peace Corps volunteers. Being British, she preferred the word *homesickness.* Why should a God-struck Hippie who carried his world about with him suffer culture shock in a brief contact with normal everyday living? She gave it up.

It started to rain, and then Felicity felt better. The night couldn't have been used for a suicide after all. She went to bed. With luck, the little Hippie would have run away by the next morning. Easy come, easy go. She locked her bedroom door, but left the front door on the latch. Before going to sleep she examined the damp garment he had taken off. It was all in one piece and it was made of the most beautiful, sophisticated material that Felicity had ever seen. There were no buttons or fastenings, but when she pressed the two sides of the front opening together they fused into one another, and then parted at a sharp tug. There was no stitching on it at all. The legs and arms and trunk were molded into a soft, fluid, almost living whole.

An extraordinary phrase sprang into Felicity's mind, prompted, no doubt, by the little man's religious vocabulary. She turned the exquisite garment about in her hands and thought—The Seamless Robe of Christ.

He was still there in the morning, asleep at eight o'clock, but cool and healthier-looking, so Felicity fed herself an apple and cooked him some bacon and eggs. It was lucky that the refrigerator was well-stocked. Normally she ate from can to cold can while George was away, but this weekend she had brought in a lot of provisions as supplementary evidence of no-suicide intent.

The Hippie wolfed his breakfast and gulped down great quantities of tea. Felicity cooked him some more bacon since he seemed to enjoy it so much, and wished mildly that he hadn't renounced the use of knife and fork. He managed to get quite a lot of fat on to George's sheets with his messy fingers, but there was something very endearing about his fragile little hairy figure, drowned in the huge striped pajamas. Felicity was wearing her housecoat again, so as not to shock him.

"We'll get dressed and go to

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church and see Father Delaney," she told him quite calmly, but the Hippie chose to electrify himself at the news.

Father Delaney papist tool of the Scarlet Woman . . ." he hissed.

"No, no, no, no, no," Felicity cried, exasperated. "Father Delaney's a perfectly ordinary vicar of a perfectly ordinary Church of England. Absolutely Protestant." He simmered down. "You'd like to go to church, wouldn't you?" she asked.

"Nay, Mistress. I will not enter a steeple-house again," he said. "The Word of the Lord comes to he who listeneth and waiteth. In the fields, in the home, beside the shores of the sea. A so-called House of God is often a mockery, where men can think lewd thoughts, though their vile bodies be outwardly penitent upon their knees."

Oh God he's further gone than I thought, she panicked. *What am I going to do with him?*

Suddenly he smiled, a sweet, gentle smile that had more power in it than seemed possible from such a feeble little frame. "I do not wish to be discourteous to *thee,* Mistress," he said. "Nor seem to mock, for it is better that thou shouldst take thyself to the steeple-house than walk in darkness."

"Thank you." Felicity said. *Well, what could she say?*

"Hast thou Seen the Light?" he asked eagerly.

Now here was a problem. He would be talking about The Way next, and Felicity did not feel equal to Sen or Yin and Yang or Whatever at that hour of the morning.

"If your Group don't go to . . . er . . . steeple-houses," she asked, "where do you normally meet to . . . er . . . Worship the Lord?"

"In barns," he said wistfully, as if remembering something that had meant a lot to him and was not now available. "In halls, if they do not cast us out. In the big rooms of farmhouses where Friends are welcomed. On the moors above Kendal where our Founder first preached the Word."

"Who is your Founder?" Felicity asked gently. She despised that faculty in herself which attracted the weak and the uncertain. She did not know that her clear, blue eyes gave out a sure, innocent—but not stupid—strength that offered instant empathy and help. It was not a quality in much demand at political cocktail parties. Here was a nut, but she sensed by now that he would never be a dangerous one, and she suspected that his religion came from the heart, not from LSD.

"Our Founder, George Fox, who now lives near Ulverstone," he said simply. "I am of the Society of Friends, that men sometimes call Quakers."

Now Felicity was on firmer ground. One of her friends at Cambridge had been a Quaker. She had been very gifted, very rich, and above all very sane.

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"How did you get to the Caribbean?" Felicity asked.

"Is this the Caribbee?" he responded in a helpless way.

You know damn well it is and how can I help you if you won't make the slightest effort? said her mind grimly, but her lips had years of practice in functioning on their own. "This is San Sebastien, West Indies," they said politely. "You must have got here from somewhere, and it's not on the normal tourist run. Where did you come from? Miami? Jamaica? Where were you before?"

"I was in Hell, Mistress," he said, and he seemed to contract into two huge, frightened eyes.

Here we go again. He must be a drug-addict after all.

"O.K." Felicity agreed. "But you weren't in Hell always, were you? How did you get to Hell? Where were you before?"

He would have wept, but there was half-a-pound of good bacon inside him, so he only gulped a couple of times. "Mistress, I sinned," he said. "I did the most grievous sin against my God and Man."

Another blind alley.

"O.K.," Felicity said patiently, "But *before* you sinned and went to Hell, where were you?"

"In Ashby," he told her. *Where was Ashby? The States? The Bahamas?*

"Which Ashby?" she asked, like a dentist drawing teeth.

"Ashby-de-la-Zouche in the county of Leicestershire."

"What were you doing there?" she asked, intrigued.

"I was practicing my trade, Mistress," he said quite normally. "I am a journeyman weaver."

If ever a man was sincere, this was the man. But what did he *mean?* Had Hippie colonies set up little medieval outfits all over rural England?

Go on and get to the bottom of it.

"Right," said Felicity, ever so calm and patient. "You were in Ashby, then you went to Hell, then you turn up here in San Sebastien. How did you get to Hell in the first place?"

"I hanged myself from a beam in Jacob Morton's barn," he explained. "I sinned against my Maker and my sufferings are truly earned." Tears rolled down and disappeared into the thin edges of his beard, but the wet, bulging eyes clung to Felicity's with the soft trust of a confiding child.

"They were to put me in the stocks on the next day," he said. "They pilloried me in Exeter and Lincoln. They pelted me with filth. There were men with great sticks gathering for what they call the Easter Fair. They had dogs. My trust failed. Like Peter I betrayed my Lord. I could not follow in His steps to Calvary."

Felicity was adult, intelligent, highly-educated and once thought a promising biochemist. And yet she believed every extraordinary word that the little man said.

"Easter was over a month ago," she half-whispered. "Where have you been since . . . since . . . you left Ashby?" The analytical, unaf-

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fected part of her brain was still stolidly pursuing the problem, (a) Where does he come from? (b) How can we get him back?

"Mistress, I told thee," he said, himself the patient one now. "I have been with sinners in the Golden Halls of Hell."

Felicity was defeated. The analytical part of her mind closed down, and left the ordinary part simply curious. "What was it like?" she asked.

"Full of devils in bright raiment. Full of lusts and music and naked women." He was all frightened eyes again. "They smiled and beckoned and summoned me with bold enticements. They tried to feed me upon strange delights, but my lips were closed."

"It doesn't sound too awful," Felicity said reasonably, but the little man was shivering with genuine revulsion.

"The flesh," he whispered. "The flesh is weak, but Thine arm was about me. Oh Lord. Even in Hell Thou gavest me the strength to defy them. Soft words went as nought whilst I could call upon Thy Name."

He must have escaped from some expensive loony-bin where they were very, very kind to him, Felicity thought.

Then there was a sudden urgent tapping at the front door.

"The devils have come for me!" shrieked the little man, who sprang up in bed and clutched Felicity's housecoat.

"Nonsense!" she snapped, but did not like it when she heard the door open and footsteps crossing the sitting room. Anybody who came into a house like that in San Sebastien would be carrying a cosh, and the Hippie wasn't much protection. Felicity almost—but not quite—wished that George were at home.

"Who's that?" she called sharply. The bedroom door opened and her heart stopped its sudden wild hammering. The man in the door was white, grave and utterly law-abiding in appearance. He was clean-shaven, too. His smooth, close-fitting outfit did not make him look in the least like a Hippie, he was more a superior sort of junior executive.

"Get thee behind me, Satan!" screamed the little man, gibbering on the bed beside Felicity.

"Jeremiah Dickenson, be still," said the newcomer fixing his eyes on the poor little chap. Some brief struggle passed mentally between them above Felicity's comprehension, and then Jeremiah flopped and lay, white and doll-like, disjointed, on George's bed.

"You fascist BEAST!" Felicity cried, leaping to her feet. (She reverted, regrettably, to childhood on the very rare occasions when she lost her temper.) "You've killed him, poor little thing. He wasn't doing you any harm."

The executive turned uncomfortably penetrating eyes on her and she was conscious of her crumpled housecoat, lack of make-up and

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tumbled, shoulder-length hair. Felicity had no reason to think of herself as wildly attractive. The sort of men who admired her were not the sort who rushed forward to say so on first acquaintance. But she prided herself, normally, on a very competent protective coloring.

Oddly enough, her appearance did not seem to upset the newcomer. He was . . . respectful; in fact, almost *awed.*

"Lady, I haven't killed him," he said, bowing fluidly from the waist. "He's only unconscious. He can be recalled at any time. I just put him out of his misery until we decide what to do with him."

"Well don't, for goodness sake, send him back to the Home where he was before," she said brusquely. "He really, truly thinks he's been in Hell."

"We shall value your advice deeply," he said. "The position is unique—disastrous, in fact. We have no precedents to guide us. It is most fortunate that you are here."

Pompous. Authoritative. Mocking her? No—he was absurdly deferential.

"Will you excuse me while I make a report to the Center?" he asked.

"Do what you like. I'm going to get dressed," Felicity said and brushed past him to get to her own bedroom.

When she came out again, all tidy, Jeremiah Dickenson was still unconscious on the bed and the visitor seemed to be gone. Then he came into the sitting room from the front door again, with news.

"A doctor and his assistant will be here in a few hours. They will come in a three-man transporter and take Jeremiah away."

"Then you'd better sit down," Felicity said. "Would you like a cup of coffee?" She was her usual self. Smooth clothes, smooth hair, smooth words. A competent shell surrounding a still depth of—"emptiness" she would have said drearily.

"Thank you, that would be interesting," the newcomer said.

Interesting was not the word, Felicity thought wryly. She hated cooking, and her food, mechanically produced, had all the slick appearance and dead flavor of tourist hotel meals. But her visitor savored the cup of pre-fab coffee and powdered milk as if it were in the Napoleon brandy class.

"This is delicious, Lady," he said at last.

"Please don't call me 'lady'. My name is North."

"Your pardon, Felicity North. I meant no disrespect."

"How did you know my name was Felicity?"

He looked confused for a moment, then laughed. "Your pardon again. Your name is so familiar that I had forgotten it is still uncelebrated."

"What do you *mean*—my name is familiar?" she asked quickly. She was annoyed, but he was relaxed and amused.

"Felicity North, born in 1933 in

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England. Europe. daughter of a rural doctor and a mother who died young. Won scholarships to Birmingham High School and afterwards to Newnham College. Cambridge; mother, by her first union, of three children, author of 'Chains of the Soul,' 'Spiritual Rebirth' . . ."

She sprang up, and her chair fell back upon the floor. She was shaking with anger and also with fear.

"What are you talking about? I'm not the author of anything. Who are you? Where do you come from? How do you know so much about me?"

"Forgive me for disturbing you," he said, now very grave and very polite. "I am not usually employed in time manipulation and have not studied your local means of communication. I have been uncouth. Forgive me, Lady."

"Who *are* you?"

"David Lesley, Controller, Head of the First Area in the Western Hemisphere," he bowed again.

Felicity was very deeply frightened. This man was powerful, in spite of his youth, and he was utterly sure of himself. "Where do you come from?" she asked.

"From Washington originally. I was chosen for this special mission and traveled here from the History Research Center on San Sebastien in the early part of '73."

Now Felicity was hopelessly confused. *Missions and Washington and First Areas* - she thought, if she thought at all, in terms of the C.I.A.

"Is Jeremiah Dickenson a *political* prisoner, then?"

"No, no," he laughed. "Jeremiah Dickenson is a mistake. A foolish error made by the History Research people."

"What do you mean? He's alive, isn't he? He's real, just like you and me."

"He's very much alive, unfortunately, and the historians will have to deal with him. When they took him at his suicide, they didn't realize that a religious fanatic of his tenacity cannot reorientate. His mind, they tell me, is as tightly shut as a flenton."

"Please," Felicity said, "just tell me one thing. I'm mad or you're mad, and I don't really mind if it's I - but how can Jeremiah commit suicide with a rope round his throat AND be alive at the same time."

"He didn't die when he hanged himself. He struggled till his mind blanked out, and then the historians took him, untied the rope and left it lying on the barn floor. He didn't die, he left his period. All his contemporaries thought he had run away. Nobody was surprised. His life in the Seventeenth Century had become quite intolerable."

Then I went to Hell and devils tempted me. They spoke sweet words. Felicity flushed with anger. They had no right to treat Jeremiah like that. He was only a baby. "Why didn't you tell him? Why let the poor little beggar suffer? He thought he was dead."

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"Lady, they tried," David Lesley assured her. "They did everything they could to explain that he had been rescued and that the rest of his life could be happy. They gave him every form of gratification. But he rejected them all. In his mind, a truly religious life is equated to suffering. No cross, no crown. He is a simple little man and lives by that fact alone."

"What are you going to do with him?"

"I think the historians will have to accept defeat. Jeremiah is no use to them for information purposes, and yet he cannot be allowed to crucify himself for the rest of his life—which won't be long. He was riddled with disease, you know. The mind doctors will probably remove his consciousness of everything that has happened from birth and restore it with an uncomplicated, childlike, contented pattern, so that he can finish his life without distress in the last quarter of the Twenty-first Century."

Here it was at last. A fact that Felicity could grasp. A key. Something to tie Jeremiah and the Controller and the Seamless Clothes into a comprehensible whole.

"Then you come from the Twenty-first Century?" she asked. She didn't disbelieve. She just wanted information.

He looked mildly surprised. "No, Lady," he said. "I was born in 2153."

Now Felicity was really out of her depth and sinking. Her delicate face shrank, like Jeremiah's, into two huge, uncertain eyes. The visitor hurried to help.

"The History Research Station," he explained, "was . . . is . . . that is, to you *will be* in San Sebastien, Caribbean. It used to be one of the two places in the world to have full time-transportation facilities. That's why it's here. The Caribbean was the first World Center of weather control with the utterly stable conditions that are required."

"Go on."

"From about 2050, world historians of sufficient standing were allowed to bring back from the past live specimens—"

"People!" Felicity gasped.

"Yes, people—to get first-hand information on language customs and beliefs."

"How interesting. How enlightening. You cold-blooded fiends. I suppose it doesn't worry you that people like Jeremiah would be upset—would feel *culture-shock*," she sneered, "would rather wallow in their dirty little Seventeenth Century than live like . . . like . . . like tadpoles in your beastly history laboratories. You brutes."

"Not *us*, Lady," he assured her. "In my time the living-recall method has been stopped for twenty years or more. We have easier ways of checking now."

"Well . . . wait a minute—" Felicity's mind groped about painfully. "If *you* are in the future for *them*—the people who snatched Jeremiah—

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why don't you go back to them and stop them doing it."

"My dear lady, I can't alter history," he said, shocked.

"But you . . . they . . . are altering history all the time. They're taking people, real people, out of their own time into the future and leaving an empty space where they should have been alive and having children and inventing things."

"I haven't made myself clear," he said. "I would make a poor instructor. The historians never take . . . took . . . people from normal existence. They only allowed themselves to remove adults who were on the point of taking their own lives—suicides. Finding them and taking them at exactly the right moment involved the most tremendous amount of research and investigation and trial and failure and disappointment. The expense was enormous. They were glad to discontinue it."

"But if your . . . their . . . history research is all carried out on suicides, they must have got a pretty distorted sense of history," Felicity objected. "Fancy basing all your information on the evidence of a bunch of neurotics!"

"Suicides weren't neurotics," he corrected her gently. "They were people whose mentality was not adjusted to the time or place in which they lived. This does not mean that they were inferior. Only that they found local conditions intolerable. Sometimes they saw a lot further than the other people of their day."

"But . . . but . . . but—" Felicity felt there must be a flaw somewhere.

"Are *you* neurotic?" the Controller asked her seriously.

She blushed to the roots of her thick, golden hair. He knew she was planning to kill herself. Yet somehow it didn't seem to matter at all that he knew.

"I don't think so," she said simply. "I don't worry. I don't get all churned up like I used to. I don't care about anything at all. I'm dead inside. Empty. Except for a few practical purposes, I don't need to exist." It was soothing to see oneself as a small academic problem. "That's why I'm doing it," she explained. "There's just no point in going on. When they find my towel and my sunglasses and my slippers on the beach tomorrow morning, nobody will really miss me. And I get no joy out of living. I'm no use to anybody, so—why exist?"

"You are unusual," he said. Again there was that curious tinge of awe in his voice. "Most of the history recalls came over in passion of one sort or another, or fear. They tended to be minorities, the victims of persecution. Earlier ones, like Jeremiah, found it easier to believe that the Twenty-first Century actually was the heaven that they had been brought up to believe in. They had no difficulty in settling down. People from your time and later were able to accept the fact of time-manipulation and thought themselves lucky to

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escape their own surroundings. I can assure you that the history recall scheme was considered most successful in its day, in spite of the cost. We still use visions made in the Center in our schools."

"Tell me about your life," Felicity asked him urgently. The new ideas—time travel—escape—were sinking slowly through her mind, and for the first time she was realizing that 1971 need not be the rat-cage that it had seemed. There were more distant boundaries, freer horizons.

"I would be honored to oblige you, Lady, but it is most expressly forbidden," he said with genuine regret.

Her face fell. She had been under strain, and the usual mechanical self-control was weakening. David leaned forward in immediate sympathy. "You, of all people, need have no fear of the future," he said comfortingly.

Felicity gulped. "The future! Listen," she said, "the future doesn't ex ist for me. I'm going to commit suicide . . . but you know that—" Her mind bounced and jarred and subsided into new, unfamiliar tracks. "You've come to take me away," she whispered. "When I swim out to sea tonight, you're going to catch me, just as I'm going down for the last time and take me—*transport* me—into your time, aren't you?"

"Not my time, Lady," he said. "Into 2073."

Felicity didn't want it. She didn't want to be a history specimen in a labeled cage. Her life had been hard enough. Why should it carry on, and on, and on, when she, its owner, chose to end it?

"You can't *make* me go," she said, gripping the edge of the dining table, pressing the obscene gold flowers into their sick-colored background. "You can't force me. I can find ways of killing myself that won't give you time."

He seemed perplexed, that smooth authoritative, competent man. Felicity had got him ruffled. "I've handled this badly," he said, and then relaxed again. "History says that you came willingly," he told her mildly.

Felicity got up and paced the horrible little room. Backwards and forwards, she struggled with unfamiliar temptations: herself, the dead mind that was Felicity North obstinately clinging to its protective deadness against another person's "inevitable"—clinging to lifelessness, not daring to trust a possible glimpse of Heaven.

"Please, please do not be so upset," David begged. "The transporter from the History Center will be here shortly for Jeremiah. I should be marked forever by history if the doctor found that I caused you such unhappiness."

She sat down.

"Please," he said again. "I was chosen for this mission for my authority, not for my knowledge of this period, which is negligible. I know only the basic facts of your pre-

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existence. Tell me about your life. Perhaps I can help you to see clearly why it is good for you to continue it."

"Well . . ." she said, and sighed, and then went on. It was easier to talk than think. "What do you want to know? Look around you. You can *see* what my life is."

He studied the miserable little room. "You were, of course," he mused, "a person to whom visual beauty was of very great importance. A theatre. I wish I could show you . . . but surely, Lady, the Twentieth Century produced less stultifying homes than this?"

"You don't understand, it's *cheap*," Felicity explained. She had never in her life talked impersonally about herself like this. But then—no one had ever been interested before. "There are lovely homes nowadays, but not for us. This is a rotten sample, but the rent is low. The oven doesn't work and the water heater won't heat and the loo leaks. Tourists won't look at it, and it was built in the hope of tourists coming. George felt he was lucky to find it. Good houses have fantastically high rents here."

"George is your lover?" he asked.

Felicity grimaced. "My husband," she corrected.

"And your children? Do families not live together in units at this time?"

"My children are all at school in England—at boarding school. Most families live in units as you call it, but George travels round, and the children need settled schooling. We've been living in different countries ever since we were married. George used to be an administrator. Now he's a Labor Adviser to new governments. We are in the West Indies for this tour. Next year we may be in Fiji or Sierra Leone."

He nodded understandingly. "With Twentieth Century travel conditions," he said, "and air transport . . . what do you call it? jets? . . . that must make a very hard life indeed."

"It isn't *hard*," cried Felicity, stung. "It's very easy and comfortable compared to most people's lives. Sometimes I go with George to different places if the accommodations are free—to Dominica and St. Kitts and Trinidad. And let me tell you that jet travel is considered a luxury, and only rich people can do it for pleasure. Everybody envies me the life I lead."

"Then why do you plan to leave it?"

She grimaced again. "I'm so tired," she said. "So deadly, deadly tired and useless. I'm nothing but an expense to George—and he's a man that doesn't like expense."

David's forehead creased. "You mean that George uses his . . . er . . . money to buy your food and clothing and to exchange for the use of this house?"

"Exactly," Felicity agreed with a small, hopeless lift of her hands. "I

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couldn't put it better myself. George uses money—of which he has a very high opinion—to pay for me to exist as a parasite. In return for that, I cook his food for him and wash his clothes—a job which any sixteen-year-old half-wit could do for a pittance."

"But you were a brilliant student. Why don't you earn money and maintain yourself? Surely in the early days of science there was employment for good scientists?"

He was so sensible, Felicity thought, it was like talking to the logical part of one's own mind. Too sensible by half.

"Look," she said wearily. "I gave up my work when I married George. I was a fool, if you like, a blind, witless, stupid little fool, but I was In Love—do you understand? Twentieth Century girls are conditioned to Love and Marriage and Motherhood from the cradle. Whatever else you do, the Home comes first. If I deserted George now, I'd be a pariah . . . no, that's not true and I wouldn't care a damn about that, anyway. The fact is, I c-c-can't go back to work b-because I'm seventeen years out of date. For my work I'd need a laboratory and technicians and there aren't any nearer than Florida. Besides, who'd want me? So much has been learned in the last seventeen years that I don't even know about."

His face was so deeply sympathetic that Felicity found herself weeping. The bitter, unaccustomed tears rolled down her cheeks.

"Y-you must excuse me," she sobbed, mopping guiltily. "S-s-self-pity is s-s-so stupid. But I haven't talked about myself for years."

"You are not adjusted to the time in which you are living," he said. "You have been educated like a Twenteith Century male and forced to live like a Nineteenth Century female. How do other women of your period survive?"

"They m-manage, I suppose," Felicity sniffed. "They really believe in Love and Home and Children, perhaps. They . . . they have houses of their own and neighbors and roots and beautiful things to make up for what they lose. You mustn't think I'm representative. Please don't despise Twentieth Century Woman because of me," and she managed a watery smile.

"On the contrary, your despair seems perfectly natural," he said. "But on the other hand, other women survived. Perhaps you lack the strong maternal instinct that brought the human race through so many difficulties."

"I expect you're right," Felicity said very humbly. "I'm a rotten mother. When the children were little I cared for them desperately. From the moment they started talking until they went away to school—at eight years of age—we had a wonderful time. I taught them all to read. They kept me company when George was away. Their little minds mopped up information like sponges

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and we used to laugh so much." The tears were rolling down again. "Christine could listen to Bach when she was only seven," she remembered wistfully. "George was furious with me for buying records. I used to borrow record-players from people who went on leave. We were in Singapore then."

"But you are prepared to leave your children now," David reminded her.

"They're not *my* children any more." Felicity said bitterly, mutilating a Kleenex with stiff, savage fingers. "Their schools and George and their aunt have seen to that. Christine, she's sixteen—thinks Bach is 'boring' now. The boys talk about games and television and car-racing and things I know nothing about. They love their aunt—George's sister. She's a widow and looks after them at vacation time when they don't come out to us. She adores them and sees that they have the 'proper' clothes and the 'proper' friends and the 'proper' books to read. Of course they're terribly polite, they never *tell* me that I'm no use for anything except cooking now. But I *feel* it. And anyway I can't cook half as well as Aunty B.

He let her sob and sob and sob, and the tears were helpful. Why had she never cried before? She wept away the dreariness and the uselessness and the heartbreak, the lonely hours when she was on her own. And the lonelier ones when George was at home and nagging about the price of a tin of mustard.

The calm, authoritative super-future man just let her cry, and mop and finally face him squarely. And what is more, he did not despise her. He was utterly sympathetic, and there was no trace of contempt in his face. That made Felicity feel guilty. He still liked her. He didn't, obviously, understand.

"You can see that I'm a failure," she said honestly. "I've fallen down on every count that might justify existence—work, love, motherhood." She drew in a deep breath of what passes in San Sebastien for cool air. "I don't . . . I honestly don't . . . want to spend the rest of my life as a history exhibit. Please let me end it, as I'd planned, and call a stop."

The Controller took her damp hands across the table, scattering the playing cards. Good God—she had been playing solitaire! How many ages ago?

"Lady," he said earnestly. "You are *not* a failure. Your work—your true, vital work—has not even begun. You are blocked and trapped by circumstances, but your potential is as great as it ever was. You have a capacity for infinite love that does not flow merely because it is untapped. I cannot tell you more because it is forbidden. I ask, I *beg* of you to trust me."

What a face! There was more pure power, pure intellect and pure command in those eyes than Felicity had ever seen before.

"I would trust *you*," she said at

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last slowly. "If I can go into the future with you, and stay somewhere near you, then I will go."

"I am sorry, Lady," he said. "Your work comes earlier than mine in time. I will take you to 2073, but then I must leave you and return to my own century."

It was a bitter disappointment, and there were obvious, gaping drawbacks. "Take me with you," she begged. "I can't trust what I don't know."

"I cannot alter history," he said. The blank wall.

Felicity tore her hands away from his and went back to the squirrel-cage pacing. Some part of her brain noticed that it was hours past lunchtime and the sun had shifted over to the kitchen window. Her mind struggled—it was fighting for her death.

"You mean well, but you could be terribly mistaken," she flung over her shoulder at him, "and your arguments won't hold water. You say I can 'work' in the future but I know damn well—and you must know—that a biochemist of my time, and a rusty biochemist at that, won't stand a chance in a civilization that has time-machines. I would be about as much use an an alchemist. You said I was—would be—an author. What have I got to offer the Twenty-first Century? 'Pilgrim's Progress'?" Her voice was tight with scorn.

"Your writing was incidental," he said. "It is cherished and admired as a revealing facet of your character—nothing more."

"Then you're lying to me when you talk about useful work," she accused him passionately. So desperate was she to believe, that she fought the chance of disillusionment with every weapon that she had.

"I did not promise you fame in biochemistry," he reproved her quietly. "Your work is . . . shall we say? . . . more concerned with genetics. I can tell you no more. It is forbidden."

"I don't know anything about genetics. If I was the greatest geneticist alive, I'd still be an ignoramus in 2073."

Now there was a disturbance on the porch outside. Felicity had not heard the gate squeak, but two men opened the door and came in.

One was middle-aged, dark-skinned and capable. The other was young and embarrassed, with a shock of yellow hair. Both wore floating catsuits of the Seamless Robe type, in iridescent colors.

They bowed deeply to David Lesley, raising their right hands to their foreheads. Felicity, they ignored. Her chin tilted up.

"Dr. John Lett, sir," the dark-skinned one said. He looked like a doctor. He was even carrying a bag.

"Emyl Peters, History Research Center, European division," the young one reported.

"Jeremiah Dickenson is in the room through there," David told them. 'He is in first-depth suspense. He can be moved without waking."

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Jeremiah Dickenson! Felicity had completely forgotten her poor little Hippie -no, not Hippie--genuine, Seventeenth Century religious persecutee. They carried him in and laid him on a plastic sofa which was losing puffs of stuffing. He was blissfully asleep.

"Have we your permission to take him back, then, sir?" the doctor asked.

"No!" Felicity cried sharply. Never mind her future, Jeremiah was too vulnerable to look after himself. "You can't let the poor little thing wake up in Hell again. It isn't fair."

The two men from the Center looked at her as though a rabbit had said, "Good morning." The young one grinned. He wasn't in the least respectful.

The doctor went on, to David Lesley. "We plan to replace his memory patterns as soon as we get him to the Center."

"You shall not have him," Felicity said fiercely, and went and stood in front of the sofa. "He's a real person and his brain's not going to be changed like the engine of a car. Keep your hands off him, you . . . you . . . you *mechanics*!"

Now they stared at her, from head to foot. She was sure she heard the young one murmur, "Quaint."

Then David Lesley quietly interposed. "There is no one whose advice I would respect more than the lady's."

Pompous. It surprised them. They looked from him to Felicity and then they became a little deferential, too.

"What do you suggest we do with him, Miss . . . er . . . Mrs.—?"

"Mrs. North," she told him, and tried to think.

"We can't transport him back to his own place and time, you know," the young man informed her. "The rope that started to hang him was found on the floor days ago. If we put him in another town, he would be persecuted all over again."

"Couldn't you take him back to a place where they don't persecute his sort of people?" Felicity suggested. "He must be with Quakers, who think the same way as he does about Sinning and The Flesh, and things. You can't cut him off from people who talk the same kind of language. But isn't there somewhere where folk like that weren't hounded? Wasn't there an Act of Indulgence or something . . . oh no, I suppose that came later."

The men from the Center seemed doubtful. They looked at each other, then looked at David. He said nothing. He was looking at Felicity as an indulgent father might look at a promising child.

Inspiration came to Felicity out of the blue. "Listen!" she cried excitedly. "Leave him here—in the West Indies. There were early Quaker settlers here, I know. They were on Montserrat and . . . wait . . . Tortola, and once when I was in Nevis I found a Quaker cemetery marked on an old map. I walked

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from the hotel to find it—I had a friend once, who was a Quaker—but there are houses there now." Ideas were bursting in on her. "Drop Jeremiah down on the beach on one of the islands, as if he had been washed up from a shipwreck—there were masses of shipwrecks in those days. The Quakers will take him in. They're good, kind people. He can even do their weaving for them. They *do* grow cotton, don't they?. . . didn't they?" she asked the shock-headed youth.

They all gave the matter serious thought, but the two newcomers did not seem to like it very much.

"Look," she begged the doctor, "you can influence his mind, can't you, without changing it drastically?"

"He's impervious to orientation, Mrs. North," the doctor said.

"Yes, yes, I know you can't budge his beliefs, but you could give him a few suggestions, couldn't you? Tell him that he got on a ship from Bristol, or somewhere, and then there was a storm? Block out the part about hanging and Ashby and put in a journey to the west country instead? For heaven's sake, hypnotists can do that *now*! Haven't you got any refinements in your time?"

The doctor's dark face crinkled at her. He was a most attractive man. "We could just about manage that," he said.

"Please," Felicity turned to the younger man. "Take a chance. I know you can't alter history, but Jeremiah's so *small*. It won't make any difference if his little body's buried in the West Indies instead of Staffordshire."

"It's against all the rules," the young man grumbled. "We're told that we must never interfere."

"Well, you *have* interfered and he *isn't* buried in Staffordshire," Felicity pointed out reasonably. "For all you know, history says that he *did* die on Nevis. Wait!" Her mind was most unclear, but surely there was something . . . She whipped round on David. "You are in the future, aren't you—*their* future, the History Center's future, as well as mine? What does *your* history say happened to Jeremiah?"

There was a sharp intake of breaths behind her. Unknowingly Felicity had broken a taboo. But David showed no sign of being disturbed. "There is no mention of his name in any record that I know of," he replied. "He has disappeared without a trace. Certainly there was no scandal of Anachronism connected with the History Center in 2073." Behind Felicity, a long, deep sigh of relief. David thought a while, then, "You have my authority to carry out the lady's suggestions," he said.

The two experts raised their respect for Felicity by several notches. They would be bowing next. The young one was looking distinctly relieved.

"I shall have to report to my Chief

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for permission to use the transporter laterally," he said. David made no objection. The youngster took a chair, sat down, hunched himself and appeared to go into a trance.

"Telepathy?" Felicity asked David quietly. Enormous interest was battling with enormous fatigue. She had eaten nothing but an apple for a long, long time, and her mind was being stretched in many painful directions.

"No," David replied. "The instrument is implanted in his skull."

Felicity shuddered.

The doctor had lifted Jeremiah to the floor and was examining his scalp with a tiny stethoscope. Presently he clipped off a small portion of hair and started to fit a small, stubby metallic object to Jeremiah's head. He took wires and implements from his bag, and David watched him with interest. Intuitively Felicity felt that the doctor's actions were, to David "quaint."

Presently the historian tugged open the front of his catsuit and brought out a small pad and pen and started making notes. After another stretch of time, he relaxed and sat up straight.

"They recommend the shore of the island Tortola," he informed the others. "An area called East End. The year 1780, month of July, when wrecks might reasonably be expected."

David stood up. "I will go there ahead of you and inspect the place," he said, all cool authority. "I can suggest to the people that there has been a violent storm."

"Do you want to borrow my equipment, sir?" The doctor proffered his bag.

"It will not be necessary," said the Controller with a smile.

"But, sir, there may be danger," the young historian was appalled by David's intent. "The weather in this century is quite uncontrolled. You may come across a real storm."

"If I do, I shall come back and warn you. You have the directions? Give them to me, please."

"But, sir . . . let me go—"

A look silenced him—almost.

"You may be seen . . ." his anxiety was genuine.

"I shall not be seen," David said very calmly and the younger man bowed and handed over the notes without another word. David left through the front door. Controllers were obviously going to mean real control in the Twenty-second Century.

"Now tell me exactly what you want this fellow to believe," said the doctor. Felicity had been watching him rig up a—microphone?—to the apparatus on Jeremiah's head.

The fair-haired man told him, clear and succinctly. He knew his history and made a good job of it. He even gave the name of the barque on which poor Jeremiah was to think that he had foundered.

"Right," said the doctor. "Is that everything?"

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"Please," interfered Felicity, "the *facts* are right, but could you put a bit of color, so that he'll accept them as authentic? Make him think The Lord had Redeemed him"—her hands fluttered about—"could you suggest that the storm—the *Tempest*—was a sort of Punishment for all his sins and now he has been Cleansed or something and can be happy?"

She was afraid that the doctor would think her a nut, but he didn't, nice man. He nodded slowly. "I think I can get that across. Not in those words, but I know the technique behind salvation sensation."

"We'd best leave him on his own," the historian said, and led Felicity out on to the porch. They sat on the low concrete wall that surrounded it, and she cried, "Heavens, it's getting dark!" in great surprise.

The road was empty. The sugar factory was roaring away and a donkey had started to bray in the waste ground behind the hotel. "Can I get you something to eat?" she asked.

"No thanks, Mrs. North. I shall be in quarantine anyway when I get home. They'd flush me right out if I took on food as well."

"Do you often time travel?" she asked idly.

"No, ma'am. I'm not senior enough. But I was responsible for this disaster, so they sent me to help straighten it out."

"Disaster? Jeremiah?"

"Yes, ma'am," he blushed. "The doctors were dealing with his adjustment, but he was my responsibility. I gave him complete freedom of the Center and showed him the transporters. He wasn't able to part-adapt, like most of the oldies do, and line up our time with some mythical place in his imagination, so we tried to get cold facts across to him, tell him where he was and how he got there, and the doctors still couldn't get him to accept. Who would have thought the little monkey'd have worked out how to manage a transporter? He did everything wrong, but by a million-to-one chance he somehow got himself carried here."

"Where *is* the transporter?"

"It was in line with the time-lab at the Center. Near your beach. The Controller sent it back this morning."

"Won't you need it to get back yourselves?"

"We have our own."

"Where?"

"Over there." He nodded, and Felicity stared at the empty far end of the porch. There was nothing there, but tiny motes of dust in the last rays of daylight were whirling round in a glimmering pool. They moved, and around them the air was strangely still.

"I understand," she lied. All the strange events of the last twenty hours were starting to press in on her harshly, and she felt as if she might disintegrate, like those bright specks of dust. She found that she was trembling. "Forgive me," she said. "I'm very tired."

"It must be difficult for you when you don't even know about the time-

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concept," the young man said kindly. "I get a shock myself when I think where the Controller's come from."

"He's about as far ahead of you, in time, as you are from me, isn't he?"

"A little further. I'm not sure, but I'd say he's due to be born about the time I die."

"Don't you *know*?"

"No, Mrs. North. How could I?"

"Well surely you can travel into the future as well as the past. Don't you all go and check what's going to happen to you?"

"It's forbidden," he said very gravely. The old blank wall. "The early time manipulators tried it and they lost some of their best men that way. We leave that to the higher mathematicians Mrs. North, and maybe they'll work out something, but I can't explain the danger if you don't understand the time concept. No, we don't travel into our future, but sometimes we get a visitor from it to give a helping hand. Very, very occasionally. Guess I'm the only one of my year to see a real next-century Controller."

She clung to the wall because her body had started to sway. Darkness was all around and the stars were twinkling vigorously. A fine night. Why was that important? Oh yes, ages and ages ago she had been going to commit suicide. Her mind drifted off and came back with a jerk. She *was* going to commit suicide. Definitely. Somewhere, someone was trying to stop her, but she wouldn't let them. She was definitely going to die. Remember, Felicity, it's important. No one's going to stop you from dying.

The light from the sitting room spilled out over the porch, and suddenly David was there in his own patch of movement and stillness, beside the other larger one.

"Everything is prepared," David said, and to Felicity, "You must eat, Lady. You are weary unto death."

She slipped into the sitting room where the doctor was murmuring into his microphone. He had stripped Jeremiah, and the white, concave little body wrung her heart.

Felicity picked up the pajamas and went through into George's bedroom. All the strength had gone out of her. She was indeed weary unto death—Death! That was the important thing. She rallied her energy. What was there to do? Make her bed? Make George's bed?

She pulled off the sheets and put clean ones on. She stuffed the dirty linen and the pajamas in the wash bucket. George would think they were the ones he had used before he went to Barbados. She washed the coffee cups and breakfast things and then climbed into a swimming costume. As soon as the visitors had gone she would go down to the sea.

She draped a towel around herself, gathered up her slippers, sunglasses and barbiturate pills and did a final check of the house. Gracious! there was Jeremiah's Seamless Robe-thing.

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Felicity crept back into the sitting room. But everyone was on the porch, ready to go. The young historian was carrying Jeremiah like a puppet in his arms. David was giving them some last-minute instructions. They were all set. Felicity pushed the Seamless Robe into the doctor's arms.

"Good-bye," she said faintly. "I hope you have a good journey," she said politely.

David said, "You should have obeyed me and taken food. You are weak." But he was not angry, that was a comfort.

"There is one more thing," he told the man and took the towel and sunglasses and slippers from Felicity. "Go down to the end of the road in *this* time," he said, "and leave these things on the beach. Put a rock on them so that they shall be found in the morning. Now go."

"Your leave, sir. Mrs. North," they said, bowing as well as they could with all their encumbrances.

Then they stepped into the larger patch of quivering air and—disappeared. The larger trembling space vanished with them, but enough remained to contain David and Felicity.

He switched the sitting-room light off, pulled the front door to, and then he took half a step towards her and held out his hand. "Come," he said, smiling. "It is time."

Felicity shook her head and clung to the doorpost for support. "I'm going to do it *my* way."

"No, you're not. You're going to come with me."

"I'm afraid," she said.

"You don't have to be afraid. Come, and come willingly. I can't alter history. You must trust me."

"How can I trust you when you won't even be there?"

He sighed. "I have told you too much already. I shall have to erase our conversation from your mind—all of it—but nothing else, I promise you. When you reach your new life you will not remember me."

"Then I'm not going."

"Now I realize why they needed a Controller for this mission," he said, laughing at her. "History records many things of you, Felicity North, but not that you were stubborn as a mule."

"You talk about me as if I were to be famous," she complained, rallying every last bit of energy, still pulling back from that patch of moving air. "But I know myself. I have nothing left in me to be famous with."

"Let me put it this way," he said, "and then let us go. Felicity, if the mother of Einstein had said that her life had been completely useless, would you agree with her?"

"I don't understand you," she said.

"Then I will exaggerate to give you some idea. Can you envisage a world in which the Virgin Mary had died at the age of ten?"

Felicity still didn't really understand. She was shaking too much. But she let him pull her gently across the porch and into the transporter. ■

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moon spore

Sometimes you get up
against a thing
that yields a magnificent end—
if you could only
figure out how
to survive getting there!

G. I. MORRISON

ILLUSTRATED BY DAVID COOK

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"MOON SPORE?"

"Yes, Dr. Franks. Moon spore infection."

"Infection? Tell me again. What did that colonel do?" The very slender man in the gray suit was impeccably dressed yet was undeniably ruffled. As the young aide reported he drew slowly on a long thin cigar.

David Hanson was proud and happy with his job as assistant to Dr. Franks. He considered his words carefully. He wasn't apprehensive. He simply wanted to give his best, in return for what he'd been given by the doctor. "Colonel Beck, USMC, punched his subordinate in the mouth. It was described as a classic left hook and it rendered the lieutenant unconscious. The colonel, an M.D., then checked the subordinate's pulse, gave the two-finger 'peace' sign and strolled out. The colonel was also middleweight champ at Annapolis. Since he was infected here at Houston, we have been notified."

"How do they know that?"

"I mean, since he came from here."

"Are there any others?"

David knew the only acceptable phrasing for his answer. "Yes, sir."

"Play the tape again, please." The tape recorder on the crowded desk whirred, clicked, hummed and began a familiar conversation.

"Liberty Two to Houston Control. We have been cleaning screens every couple of hours but the situation is about the same. We're getting nowhere." Dr. Joseph Franks listened to the words in static and tried to recall how long ago it had been. "Houston Control to Liberty Two, diagnosis, silicosis . . . that miner's disease from coal dust."

"Understand, this is unbelievable. No other problems except usual . . . ears plugged some . . . some fatigue headache . . . and sniffles from this dust!" The recorder stopped except for a low hum.

The doctor's aide moved, tapped a key on the machine and listened a moment before sitting back.

"K. Bannon," a new voice droned. "Civilian clerk typist from the lunar receiving center, Houston, was committed by her family to Natchadoges County Hospital. The ex-beauty queen broke her two-year engagement when her fiancé enlisted in the Air Force. Next, she delivered an impassioned speech to a library gathering, threatened the lives of two newspaper editors, and defied the general order to the extent of breaking a beer bottle over a policeman's head. This was kept from the press. She is considered a 'nut'. Papers for her emergency leave of absence have been forwarded." David switched the machine off, dropped back and swung one long leg over the arm of the chair.

Franks flung his dead cigar at an ashtray, watched it miss and land on the pile carpet. He spoke without moving, "How does it look now?"

"Worse. There are indications of epidemial infection. Spreading. It's

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being transmitted and moved. The info is classified. I used your signature for the order." The blond youth was intent.

"Good. If you hadn't . . . well. Thank you, David. You know I am the only logical man responsible."

"Not really, sir. The accident was the station's fault."

I am responsible. It's been a long time, but I should have been aware and done . . . I don't know what . . . but something. What about the MP who slugged the lieutenant?"

He was exposed in the accident. He's under house arrest pending investigation of conduct. He also wrote letters to the heads of every known government without regard to chain of command. He assaulted verbally, and then physically, that junior officer in the presence of witnesses. They were being interviewed for a TV talk on space and the future. Beck asked for medication for an ear infection, migraine, and a 'nasal' condition. He's in good condition at Walter Reed." David reported in an unemotional tone, but Franks caught every word.

Thank you." Franks lifted the brightly colored phone on the desk and spoke softly. He became annoyed and raised his voice. "Yes, Damnit! Moon spore! And before you call for the meeting you better check the names with me for clearance! You can tell your boss, I said so!" He started to slam the receiver but replaced it gently. He rose, walked over and picked up the cigar butt. He looked older than his years.

"We'll be busy."

"Yes, Doctor."

"Spread your stuff out, David. Let's get started."

In Walter Reed Hospital a small frightened wife stared at her husband. "I can't believe it, John."

"Liz, I'm wrong by the book but I didn't do anything wrong. I belted that idiot and he needed it. He's the one that's been a bottleneck all the way and all of a sudden, here he is not just grabbing credit, but saying that everything is beautiful! I just wish I took a better shot, used a combination on him."

"There are the letters. You told them about them yourself."

He grinned. "Don't read me off for those until all the results are in, sweetie. We've got a daughter. Most of those people I wrote to have daughters, too. We can take our lumps but we should try to save them from some. Right?" She took his hand tenderly melting his exasperation. Liz Beck felt capable of knowing when her husband was sane.

She answered the knock at the door. Two sturdy guards flanked the captain who removed his cap before speaking.

"Mrs. Beck, Colonel, please bear with me. Your daughter has been taken to the dispensary. I'm asking your warrant of good conduct. It's serious. I want you to accompany me." When they stood without

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speaking, he visibly relaxed from his awkward attention stance. He nodded to the guards who fell in behind them as they filed out and entered a waiting car. "My information is that she complained of her ears hurting and she was sniffling a lot and then she started screaming." He paused and watched the colonel carefully. "They say she took your medals off the wall and threw them in the garbage disposal and then wrecked your ship models and threw them through a window."

"She's just ten years old," murmured Mrs. Beck.

The colonel was in deep concentration, his arm about his wife's shoulders. He asked the captain for a pencil. He scribbled, seemingly erratically, on a piece of paper, found a blank sheet, wrote briefly, tore out the page, folded it and handed it to the captain. "Without reading this, get to the Lunar Receiving commander as fast as possible. I'm being rational . . . I assure you." He waited. The captain hesitated and then took the note.

"We're almost at the dispensary. I'll start it from there in a classified cover and have it flown out. I won't read it, sir."

Beck smiled wanly and replaced his arm about his wife as the gray car slowed to a stop. No one spoke as they entered the drab building. One guard stayed close as they talked with the doctor and nurse. The captain sealed the message and sent the other guard off with it.

"What is it?" Franks barked into the phone. He listened, started to reply, choked and yelled, "Wait a minute!" He placed his free hand over the speaker. "David! A classified message just arrived for Lunar Command from BECK! They haven't touched it!" He watched the freckled face of the aide rise from behind mountains of reports. He returned to the phone. "Did the envelope get to Command Headquarters? . . . The courier called in? Fine! Now!

"In about an hour I'll leave for the meeting. I give you these orders. They are equal to orders from the vice president. Activate your quarantine area and all necessary personnel. All of them. Expect about three hundred"—he looked to David, who nodded—"or more guests. Right? Now! You will post security. Direct the courier to quarantine. Instruct him to give me the message and obey my orders." He paused again. "We will use a code name—Spoil Sport. It will be discussed by no one!

"People will arrive here, give that code name and you will quarantine them until further notice. They probably won't expect it, either. You'll have to arrange something special for this because anyone they are physically exposed to must also go into quarantine. Do you understand that completely? Yes. If they arrive by plane, the entire crew . . . WHAT? . . . Sir! If you don't, it will be your head! You'll find quarantine space! You'll maintain it!" He hung

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up quickly. In a Durante-like gesture he lifted his arms from his sides and let them drop limply back.

"David, we are committed. We can only lose our jobs, prestige, money—that jazz. I don't see a choice. I won't blame anyone for what I feel is my moral obligation."

"Yes, sir. You said it, 'we are committed.'" He chuckled, "We may be at that before this is over. Shall I guess what Beck's message says?"

"It better include ear infection, headache and sniffles. What else do you expect?"

"A timetable. Beck's a good diagnostician. He'll know what we need. I wonder who he infected. He would have to have passed it along to recognize it as epidemic."

"The courier should call any minute. Do you have any estimates on the time elements?"

"Still very loose. It has to relate to the people in the accidental exposure not being confined for the full period that the astronauts were. The astronauts came out O.K. which will take some separate study. The time worked before when no one here got infected. Right now we have to find a solution to the problem. Later we can figure out why. One door being opened too soon shouldn't make all doors useless."

"True. Incubation, transmittance, incubation, attack all seemed to fit except for the absence of attack symptoms in the middle. First we handle first needs. I fed what we have so far to the computers but we have to wait for clearance on some of the information." He snorted. "It was on TV and in all the papers but now they have to clear us! Horsefeathers! I didn't open that stupid door!"

"Protocol, sir." The blond crewcut aide rubbed his eyes. Frank watched him closely.

"Get some sleep so you can relay the computer data to me in Washington. I'll get some sleep on the plane. Be careful and go slow. We can't afford to miss one item."

"Yes, sir." Hanson yawned and the older man smiled as he realized that, although giving away thirty years in age, he was insistent of himself that he maintain a facade of tirelessness. As he gathered the papers into folders he felt the facade slipping. His mind rejected weariness and began planning and conjecturing the Washington meeting.

"How come a taxi, sir?" Reginald Seaton John Bauer, Brigadier General, USMC, really didn't care at the moment but he figured it was polite to make conversation when riding with the vice president.

"Borrowed, General. Attract less attention to the meeting. The driver is Secret Service though."

"Then we can discuss the meeting?"

"No use, really. I don't know enough about it to discuss and you know even less." The vice president, Bernard Richards, was easy-going. He moved his gangly frame into a

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sprawled position in the spacious seat. "May as well relax. We have a long ride. Also, I answer to 'Barney' and I would prefer to call you something more congenial than 'General'." He held out his knobby hand which the Marine gripped firmly.

"Yes, sir. I'm called . . . well, Rusty is most common." R. S. J. Bauer, USMC, mentally blessed his parents and all the others who had at one time or another given him names. His complexion darkened to match the color of his brick-red hair and he was pleased when the vice president's reply didn't extend the subject.

"Fine. I received very little notice of the meeting. A Dr. Franks called for it through the President. I have reason to believe that it's important from my own knowledge. I met Franks last year and he impressed me. You may be prepared for all of us to be treated equally. He doesn't use much protocol. He is simple and direct. I like his style."

"What's his bag?"

"Pardon? Oh." The vice president smiled. "Good question. Tonight I'm not sure. He's medicine with space and biochemistry thrown in. Not a wild professor and he makes the long-hair intellectuals appear impotent. I said—I like him and I'll tell you one more thing. He's no salesman. He doesn't sell, he tells. I expect we'll hear something and that we'll have work to do. No selectivism—no bag. No Marine deal, Rusty, and no Air Force or Army deal. Just work." He thought for a moment. "Answer your question?"

"Yes, sir. Very well, sir." There was a strong tone of interest in the low reply.

"Don't expect to sell him a bag either."

"Yes, sir. Touché, sir." The Marine's thick eyebrows almost came together in an angelic expression.

"No offense. You Marines have a reputation for some things." Richards expected a direct reply and got it.

"Damn right!" Rusty grinned along with him.

"O.K.! Some ding-a-ling connected to the space program goofed and now a lot of them are acting ding-a-ling. What does that have to do with us?" The admiral obviously felt that the meeting was wasting his time but didn't want to be so impolite as to come out and say so. He was a small man, nattily dressed in the latest fashionably lurid shades. Franks felt uncouth in the man's presence and irritated by the choice of words until he restored his own esteem by making a mental bet as to whether the speaker did, or did not, have his hair pompadoured at a beauty parlor.

The doctor measured his reply weighing the total responsibility as his own. "Admiral, I apologize for your inconvenience and time. We have another choice." He tapped the papers before him with a forefinger. "We can forget the whole thing. We

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can go home or to a party. We can do anything else we want. There is one point to consider though: If we do any other thing except take care of this *now*—we can very reasonably plan to make reservations in a mental hospital. We would best plan it and make reservations because they'll be crowded and we won't be safe anywhere else. That's the picture. You, Admiral, which institution do you choose?" He sat down quickly. The vice president gazed tranquilly at a pencil that he held and spoke softly.

"We are assembled at the direction of the president. We are confronted with incidents that have occurred to several people involved with, or exposed to, lunar dust. We have heard of a spore in that dust and have evidence that it causes these problems. There is a possibility of an epidemic of these incidents which are manifested in mental aberration and are believed to be the result of infection from this alien spore. The problem could affect the entire world and, in fact, may be doing so now. I anticipate a problem. Who to blame?" He stopped. He still hadn't raised his eyes from the pencil. He repeated. "Who to blame?" He looked from man to man around the table. "Lesser men might concern themselves with that now. Gentlemen, we won't. We will not begin to. Am I understood?" Several faces reddened as he looked at them. He had anticipated accurately. He returned his attention to the pencil. "Dr. Franks, will you please continue? I believe we are in agreement and that we need to know facts as to whether it can be fought, how, and what do we need to do?" He smiled gently and inclined his head to the doctor.

Franks was wound tightly. He started to lift a hand to rub his eyes but straightened and arching his back, adjusted his tie. When he spoke his voice tone was more measured than before. "We have taken all available information, related it, analyzed and evaluated it toward definite conclusions. They aren't speculative anymore." An Army general let air through his lips in a sigh. Bauer didn't realize it but he flicked a scornful glance at the general. The attention was drawn back when Franks leaned on his fingertips on the table. The vice president put down the pencil but didn't look up.

"Our conclusions are as stated. We either do what is needed immediately, or prepare for absolute chaos. I'm not speaking loosely. Neither will I understate the amount or type of activity required. We must arrange kidnapping of an unknown number of, as yet unidentified, people all over the world. We must have support, intelligence, and logistics."

There was no question of interest, attention, or boredom. Every man at the table leaned forward with mouth agape. Even the vice president who asked:

"Isn't that strong?" He knew the answer.

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"No, sir. Our problem is the quarantine of the people exposed just as in any epidemial case. We have the concern that if we leak information, we will allow panic. The ramifications of a panic about a moon spore epidemic would destroy any chance of a successful quarantine. We wouldn't know which was fear and which was infection. It would spread. Without successful quarantine we are wasting everything. We have to identify all of the people exposed and isolate them without starting, or letting anyone start, resistance. We must be drastic. I see no other way. If anyone can, I'm ready to listen."

Rusty Bauer spoke. "Seems to me, Doctor, you might use some Embassy Marines and their buildings around the world. I'll take it on my own to offer their use. You'll need help, so anything the Corps can do, say so." His eyes twinkled. "We Marines have a reputation that I was reminded about tonight. We just might be experienced at stealing, or borrowing, or even kidnapping, or whatever you need. Our Embassy Marines did things without getting caught or they wouldn't be Marines with Embassy duty."

"I know the value of your men and appreciate the offer." Franks scanned the table. "The code name is 'Spoil Sport' and it carries all priority and authority. Our Command Post will be at Lunar Receiving in Houston to have computer ability and information available as well as communications."

The vice president interrupted. "Use the code name to clear anything. Air Force One is ready to take you and its communication systems are open to you. I'll be staying in Washington. Good night, gentlemen, Good luck. Doctor, one moment, please." Franks remained as the others filed out silently.

"I would like you to keep me posted personally. Don't feel that you have to call at specific intervals or everytime something happens. Get the job done. When you have time that you can spare and have news, call me. You can reach me at this number any time. Don't bother about the clock. If you have bad news and don't want to call, then don't. If you have bad news and want to call, then do. The president will be depending on your communication through me for information. We're partners, Doctor. I expect a lot and I am depending on you--WE are depending on you." He stood and they shook hands solemnly. Franks nodded his head quickly and hurriedly left.

The Lunar Receiving commander was usually a patient man. He had come to command this base through the ranks on the basis of his ability. He arrived patiently stressing that patience was the key to getting anything of worth done. He always had got his way in time, kindly, and without furor. He was, however, human and subject, as such, to the vanity of revenge when it could be afforded.

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He blamed this trait on an Irish grandmother. This evening he leaned back and relaxed luxuriously with the phone caressed to his ear. Eyes glinting, he curled his upper lip into what he considered a wolf-smile and purred into the speaker. His mind echoed a previous conversation when Dr. Franks had given him orders as though he were a recruit.

"Is that right? You will arrive here? You are in the 'Spoil Sport' operation? Uh HUH! What will your ETA be? Uh huh! Well—tell me how many people are with you. Yes!" He could feel his ego preening like a cat as he warmed up to the moment of triumph. "Hm-m-m, I have the gravest of orders about what to do with you! As you know! HAH!" The phone emitted squawks and he held it away from his ear until it quieted. He cackled in a put-on 'fiendish' fashion. "You say you're different? Is that right? Orders are orders, Buster, and don't you forget it! How many people in that crew? What accommodations? What's that? You haven't been exposed? You're lucky." He felt satisfied "Get in here and get this done with. I got word from DC that you were en route. Everything is set up. Just don't forget who's boss of this base again -right?" He pitched the phone onto the stand, stretched his legs out and laced his fingers together over his loosened belt. Maybe older, softer, fatter, but still boss. That should be good for my tension, he thought. His smile made his face feel happy even as he realized his envy of the doctor. He felt more equal.

The vast control room was all but deserted. Of the military personnel only Bauer was present, the rest off sleeping, reading or playing gin. He had a corner out of the traffic. He had made many phone calls and had coded lists of information on his desk ready for any eventuality he could figure. He enjoyed the scene when the base commander came in and went to Franks. Bauer couldn't hear them but he could read their facial and body expressions. The base commander was trying to make amends for his vengeful radio conversation when they arrived. It was amusing since Bauer knew Franks hadn't paid any attention as far as personal feelings were concerned and no one had ever been out of "grace." A uniformed man interrupted them and handed Franks a sheet of paper which was read quickly. There were no trivial greetings when the doctor passed it along to Bauer. The Marine was cross-checking lists and lifting a phone even before the doctor turned back to his own desk.

One moon spore case was content. Infected at Houston, he now sat on a Wake Island beach watching a saloon burn. Down the road from the airport, nestled behind quonset huts from the traffic, the cocoanut masks and tiki decorations lit, flamed and reflected their light in the lagoon. They'd never again confuse a

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drinker's eye. Amid the bizarre mixture of military and civilian fire vehicles a small group of spectators chattered. Drinkers from this bar and the one at the bowling alley, they commented philosophically about the fire's origin. Someone brought a case of cold beer which was passed around and enjoyed in the psychedelic light. The infected man basked in the conversation and tropic night.

"I heard an Air Force guy went ape and started it."

"Nah. Probably some G.I. on his way back from Nam."

"One of them going, more likely."

"Maybe it was one of those sexy flicks on the quarter movie machine got too hot?"

"I bet someone from the airline gets blamed."

"Too bad there isn't a ship in. You can blame those sailors for anything!"

"Blame it on the moon!"

"Was it started or what?"

"Who knows? Pass me a burpsie, Baby."

The infected man gloated with a beer in each hand. He knew. He had started the fire. Helluva good place for it, too, he decided. "Blame it on the moon." He giggled and drank and poked at his itchy ear with a sandy finger. He hoped it would be more comfortable the rest of the flight. At least his headache was gone. When he thought no one was looking he pitched an empty can into the lagoon, cadged a full one and started hiking toward the airport. He sniffled and planned to sleep all the way to Tokyo. His plans were being changed.

As the "fish" were identified, the net was flung out. It came in relentlessly and successfully from strange and distant places. Red-eyed young Hanson considered a nap in the doctor's lounge or even on one of the dark silent machines. The military people began planning a party and forming a club complete with formal reunions. In his corner, Bauer twitched his nose as though smelling something and moved quickly to Franks' desk.

"What is it, Rusty?"

"Doc, we're out of contact." He tried clumsily to convey that he needed help to make a serious point. He was trying to avoid the appearance of fault-finding that they had neglected an important matter. He was relieved when Franks nodded.

"What are we missing?"

"Well, this Texas girl for one. She's not in a quarantine and she's exposing the others in that mental hospital– like Beck did with his kid in D.C. We don't have the people who are exposed to her being covered."

"I goofed." Franks stared at the Marine. "I goofed more, too. It will be difficult but we'll take care of it. You said 'contact' also. You meant communications. You're right. What do you have in mind?"

"We have all these phones and ra-

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dios but they're all internal. We're out of touch with outside. I don't even know if it's raining or snowing outside! I got a feeling that I should!"

There was a general pause of consternation and then they erupted into frenzied activity. Phone calls. Men and women in and out until they huddled over a small, cracked plastic brown radio that had just two big knobs. As it warmed up they calculated news report time and stared pathetically at the dial knob. Amid dot dash code and terse formal jargon of the center's awesome electronic system a rock and roll chant and a twang of guitar cut like a baby's cry. They twisted the dial frantically.

"... Was up one quarter for the day." Their response was sudden and in anguish. "We missed the news!"

"Shut up!" They were silent as the station made its identification. ". . . Five persons arrested in the Shamrock Hotel disturbance were released today on bail. The rest, all military personnel, are still in custody. The Air Force issued a statement that disposition of their recruit"—someone coughed—"is pending an investigation of the incident. He and the other ten are being held on 'open charges'. Now—a word from Enterprise Motors and then the weather report. . ."

"What was that name?"

"No. Dummy! The recruit!"

"It was the fiancé, or ex-fiancé, of Kathy Bannon, the Texas girl." Franks folded his arms stoically. Bauer was already on a telephone. The doctor unwound his arms, lit a cigar and waited. He conjectured on the situation and thanked his stars for the Marine.

In Franks' private lounge Bauer struggled with the collar of his dress white tunic. Sighing loudly when it finally loosened, he quirked his head in a wordless inquiry to the doctor. Franks pointed to a cabinet in the corner. The Marine opened the cabinet, sighed again and brought out two glasses and a bottle of bourbon. He poured some in each glass. Still silent they raised the glasses in a toast.

"You'd have been proud of me, Doc."

"What happened?"

"I met the governor and mayor and chief of police and the news editors. They were the toughest. Nobody liked it but we do anything we want with no interference or publicity. I told them nothing."

"They must have had some demonstration to give in like that!"

"The chief says curiosity seekers are still a problem at the hotel and he has men quitting."

"I thought there wasn't any violence!"

"There wasn't. They were ready for that and got something else. The crowd was ready to explode and the boy took over. He was sort of contemplative and peaceful, but he got

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to them. Hell, how would you react if somebody gently explained to you that you were out of your mind and you suddenly knew they were right? Some experience! So they were breaking the law and the police arrested them. Peaceful! No crazy cult or anything, just regular people who don't want any more people hurt or killed. I would have been impressed. I am impressed!"

"We've already moved the girl and the hospital people and it was the same way. She helped. Apparently during the irrational stage the brain gets hyper-ventilated and when they're coming out of it this makes tremendous mental capacity. Beck, in Washington, computed the incubation and transmittance data to near perfection and he didn't have any outside information, let alone computers! Little wonder these people were influenced as they were."

"Too bad," Bauer murmured. "Too bad there's that irrational phase." Franks nodded in agreement.

The great black teak table dominated the room and was avoided by the men who lounged in the side chairs or stood talking in groups of two or three. Their attitudes varied from fatigue to smugness. They ranged in dress from sloppy suits to ornate uniforms with gaudy splashes of colored ribbon. Franks chatted with Bauer who wore a suit with too wide lapels. When the double doors opened and the vice president entered the men all quietly took seats around the table. The vice president spoke very softly.

"Welcome back to Washington. For your information, we have monitored all communications in the world for the full incubation period plus ten days. We used underwater, space, you name it. There are no reports of a nature that would or might involve moon spore. You have done the job. The President said to tell you, 'Thank you'. I can't add anything to that. The job is well done."

"I should say so! And a job it was! I expected him to be here, Mr. Richards." The admiral was visibly irritated. "I rather expected some form of . . . recognition . . . of this work we've done!"

"I expect some," Rusty Bauer said. "I expect some and I expect it will be quiet. I, for one, don't care for any noise about what might have happened."

The admiral flushed and glared from man to man as though daring anyone to agree. He stopped when he reached Franks.

"I've respect for your position, Admiral, but." He stood and leaned his knuckles on the table. He felt a nerve tic in his cheek and wondered if it showed. "Some of you, I owe thanks and I don't even know what you did. Some of you weren't privileged to help but were there to help if possible. Thank you." He lowered his voice. "As for me, I apologize for whatever I might have averted and

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didn't. I'm glad we're done. We came too close. I suggest we go home."

"Motion accepted as made, seconded and carried unanimously." Richards stood, walked over to place his arm about Franks' shoulders. He waited until only they, with Bauer and David Hanson remained. "Rusty, I heard that you have a cabin near here. Any booze there?"

"Enough for a battalion, sir! There might even be enough for all of us!" They laughed and left together.

Young David was a chuckler. He chortled now as he roamed the cabin drink in hand. He picked up a bottle and attempted to splash some in the others drinks despite their protests. The bottle was still nearly full. The four men were scattered randomly in the vast room that was the cabin. In the quiet countryside there was no need to raise their voice when they spoke. They could be heard at normal tone from the extreme bunk end of the building to the great fieldstone fireplace. Each was relaxed beneath the high roof rafters. The helter skelter Indian rugs, framed photographs, paintings, cased old guns and exotic knives added to their rapport. The aide coolly eyed the vice president, "All present and accounted for, sir. Now are we told why?" He was very sober.

Richards smiled easily. "Yes, David. Dr. Franks will brief you. Before he does, I'd like to say thanks personally for not disappointing me. I

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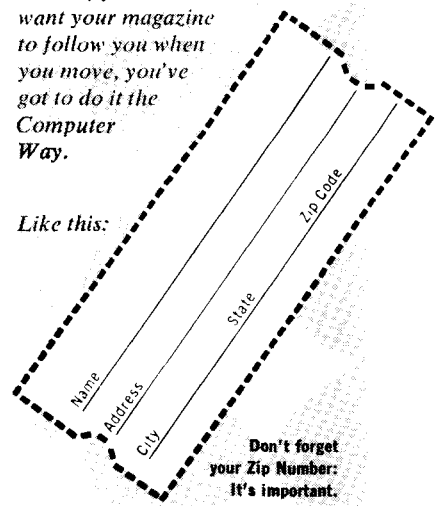

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have high hopes with all of you. The President has, too."

Franks walked to each of them and handed out small purple metal containers. The purple was an anodyzed identification color. The containers were heavy for their size. David looked at his and chuckled.

"Baby! LSD it ain't!" They rocked in their chairs, the laughter draining away tension. Franks' smile was tender.

"Gentlemen, these containers hold moon dust that we know has spore in it." He sipped his drink and over the glass his leveled eyes met their steady gaze. "We are not being exposed—unless we choose to be." He might have caused more reaction by announcing it was a new cheese spread. Three totally attentive people waited for him to continue. "Anyone who wants to can leave now. I intend to open my container, expose anyone remaining and stay here under controlled conditions that can be scientifically evaluated. Before I open the container I will signal a perimeter guard"—he glanced to the vice president who nodded—"and after that no one will be allowed to leave or enter. There is enough food and equipment here for months. Rusty says there is even enough booze." He grinned at the expressions of their approval.

"Why are we doing this, Doctor?" The vice president spoke from the far end of the room. He joined the laughter of their recognizing his words as a cue.

"Sir, we can't identify why the astronauts reported no irrational problems. If we use animals for tests we lose the human ability to express emotion regardless of how extensively the tests are made. None of us question that all the people who were infected, and caused so much difficulty, have been ultimately better off for it. In fact they aided in some improvements in our society. There were no deaths—and major increases in ability to organize thoughts. We need to use this if we can! I don't feel that there's a big risk—or I'd be here alone. We agree and so we are here. We could have more or less people. You, sir, agree with me that this group, these particular people, with their unique abilities and qualifications . . . and . . . unique independent intellectual capacities, combine to offer a maximum chance for success. We are not shooting for the moon. That's been done. We are trying to harvest something more from that feat and I don't mean to sound heroic about it."

"Good go, *amigo,*" Bauer was peeling at the tape around his container cap. "Only how come I can't open mine? It seems loose." He lifted the cap from the container.

They grinned and uncapped their individual packages to look at the gray dust as Franks conspicuously held up a small box and pressed a button on it. David checked his watch and made notes on a pad.

They raised their four glasses in salute and sipped. David made a false sniffling noise and chuckled. ■

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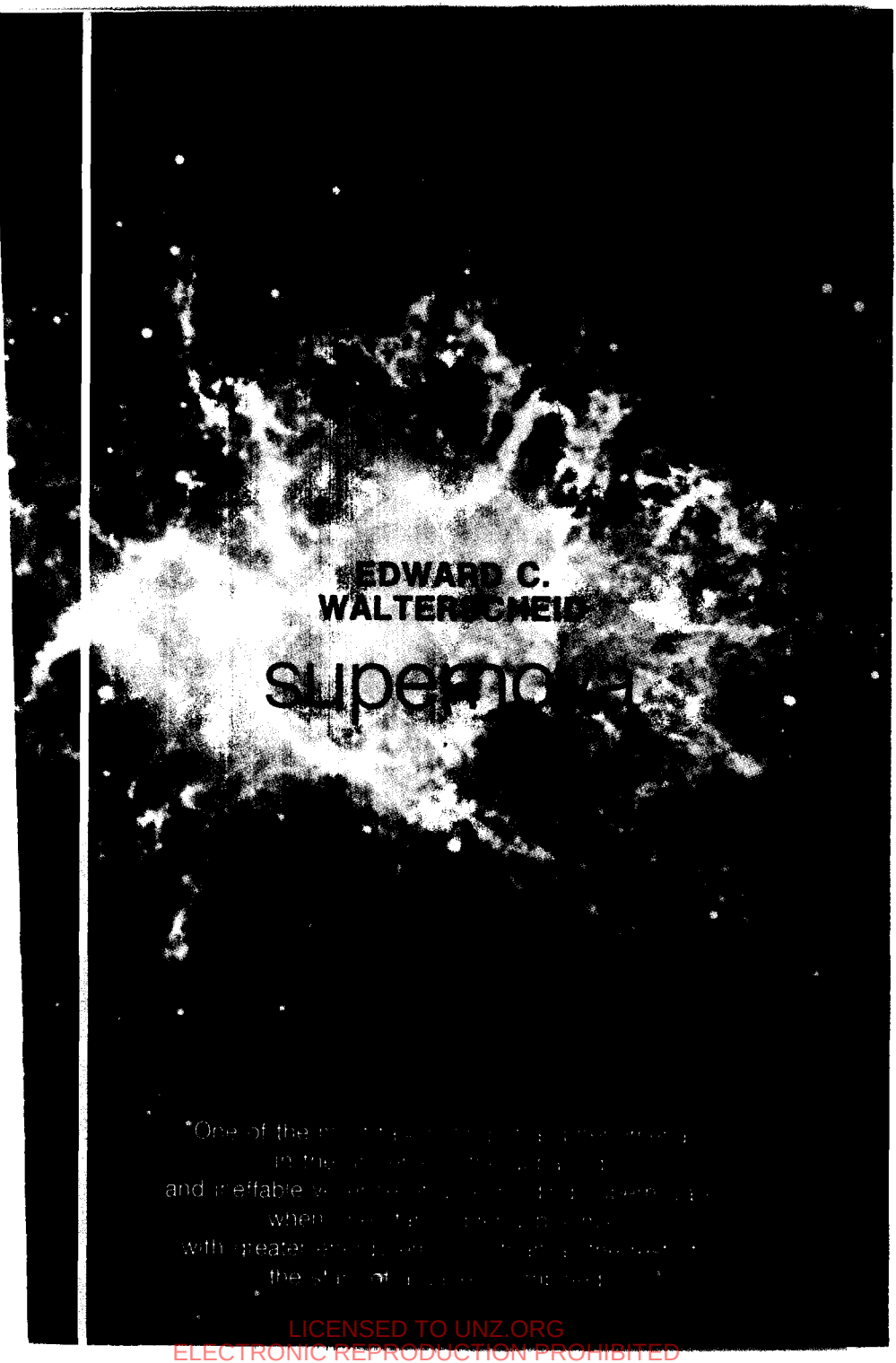

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Man seems almost inevitably to be fascinated by the thought of catastrophic events. Science-fiction writers, being those members of the species with somewhat better imagination, frequently conceive of catastrophe on an absolutely gigantic scale. Thus it is not surprising that many of them become intrigued with the largest possible stellar cataclysm that can occur—the supernova.

Arthur C. Clarke, for example, has written a story based on the idea that the star of Bethlehem was a supernova. The twist is that the supernova in providing the light to show the way to the Christ child also destroyed a gentle and advanced civilization residing on a planet orbiting the exploding star. The story is told through the eyes of an astrophysicist who also happens to be a Jesuit priest. When the realization dawns on him as to what has occurred, he is left forever with the question: "Why?"

Whatever the star of Bethlehem was, there is a general consensus today that it was not a supernova. Although we have no reason to believe that supernovae are particularly rare as astronomical events, we have reasonably sure knowledge of only seven within our galaxy since the birth of Christ. Six were discovered through visual sightings and one by a somewhat esoteric method about which more will be said.

The first two, of which a believable record exists, were discovered on December 7, 185, and in March 369 by the Chinese. They were called "guest stars" because they came, made their appearance for a time, and then faded away (Figure 1). There is no doubt about the next supernova which was first observed on May 3, 1006. It is recorded in Egyptian, Arabic, European, Japanese, and Chinese chronicles.

On July 4, 1054, appeared the most famous supernova of all. Today, we call its remains the Crab Nebula, and it is perhaps the most extensively studied object outside our solar system. It was observed by the Chinese and Japanese, but there is no indication that it was seen in Arabia or Europe. Strangely enough, we have evidence that it was observed in North America. A cave drawing by Navaho Indians in Arizona, known to have been made during this general period, shows a rising half moon with a circle located at one end of the crescent. Calculations substantiate that the outburst must have been easily visible 2° south of the moon on July 5, 1054.

The outburst of November 6, 1572, was first seen by Tycho Brahe on November 11th. He studied it in detail and his observations are still the best we have of a supernova

Fig. 1. These three views of the supernova in IC 4182, taken with the 100-inch telescope at Mount Wilson, illustrate the manner in which the light from such an event fades away with time.

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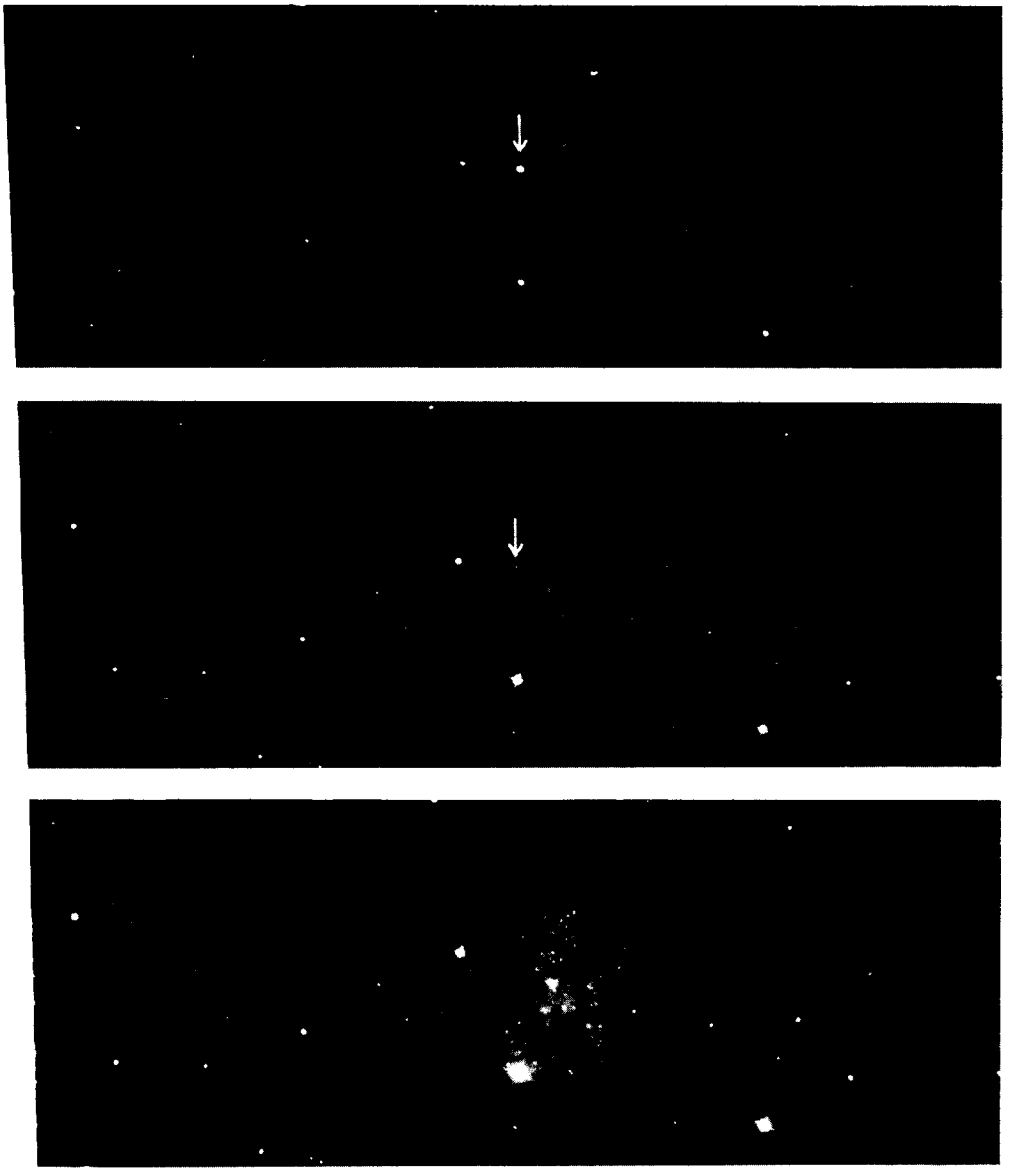
SUPERNOVA IN IC 4182



a) 1937 Aug. 23. Exposure 20^{m}. Maximum brightness.
b) 1938 Nov. 24. Exposure 45^{m}. Faint.
c) 1942 Jan. 19. Exposure 85^{m}. Too faint to observe.

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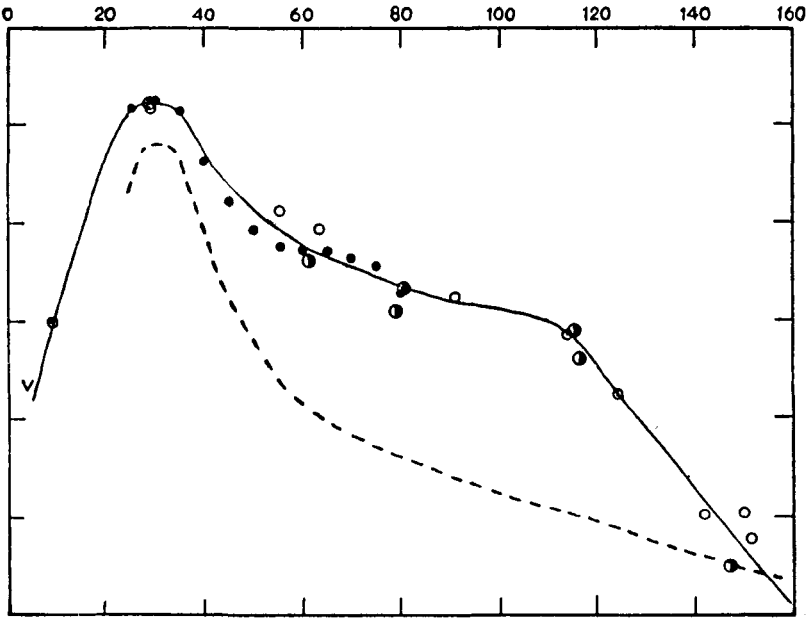

Fig. 2. Supernova light curves. The dashed line represents the typical type I curve whereas the solid line is a composite light curve for three type II supernovae. The points represent the actual measurements made of the light from the three supernovae. The ordinate is photographic magnitude and the abscissa is days. Scales have been shifted to bring the curves into coincidence.

(Cecilia Payne-Gaposchkin (1957) *The Galactic Nova*, North Holland Publishing Co., Amsterdam, p. 262).

within this galaxy. The last galactic supernova to be observed visually was first spotted October 9, 1604. It came to be known as Kepler's star—although he saw it almost one year after it first appeared.

The most recent galactic supernova of which we have concrete evidence occurred in Cassiopeia about 1700. Although it apparently was not observed, we know of its existence now because it left behind the most powerful radio source—outside of the sun itself—yet discovered by radio astronomers.

Within the last several decades a rather detailed search for supernovae has been carried out at Mount Palomar Observatory. As of the end of 1969, 260 supernovae had been discovered in 240 galaxies. Two galaxies have revealed four supernovae each, and ten others have disclosed two or three. Presently, about one new supernova is being found each

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month. These are mostly very faint.

What is a supernova? One popular answer, of course, is that it is an exploding star. This is true but it is not enough. Many stars undergo explosions—some of them repeatedly—without giving any indication that they are any worse off for it. These are the stars known as novae. Once their outbursts of light have faded, it is difficult or impossible to detect any discernible change in them. They appear to be the same as always.

Not so with a supernova. The star undergoes an irreversible and catastrophic change. It may even die, i.e., be utterly destroyed, although the more likely prospect is for the formation of a white dwarf or a neutron star.

Astrophysicists tend to characterize supernovae in terms of energy release. They classify a star as a supernova when a release of about 10^{50} or more ergs of energy is triggered within a time scale of 1 to 100 seconds. Now an erg is a small unit of energy, but what we are talking about is more than a hundred thousand billion billion billion billion billion ergs. Such a tremendous release of energy is meaningless, even to most physicists.

Consider the sun—a perfectly average star. Each second it converts 700 million tons of hydrogen to helium. The amount of energy released each second by this thermonuclear process is enough to render the earth instantly uninhabitable, if it were all to be focused on it and absorbed by it. Yet at this rate of energy production, it would take the sun about a billion years to produce the amount of energy that is triggered in less than 100 seconds by a supernova.

A supernova can also be thought of in terms of its light output. For example, a supernova recorded in 1885 in Andromeda was about a hundred times brighter than the output of the entire nebula. In other words, for a short time that one star gave off more light than the total output of the hundreds of millions of stars comprising the system.

A much more pertinent question to today's astronomers and astrophysicists is: Why do some stars go supernova and others do not? It is clear that many stars do indeed die peaceful deaths and never during the course of their long evolution come close to cataclysmically exploding. If all stars at some time during their history went supernova, we would see more of these events than we do.

In recent years some plausible answers have been suggested to questions such as this. The answers are not complete, but they do at least indicate that a good start has been made in the task of understanding the phenomena of supernovae.

F. Zwicky, who has been responsible for the Palomar supernovae search, has attempted to classify supernovae into five types. It now appears that his types I, II, and V are definitely established while his types III and IV are still in dispute. A com-

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plicating factor is that peculiarities exist in some supernovae which otherwise would be classified as types I or II. Whether these objects should be given separate classifications (i.e., as types III and IV) is still a matter of opinion among astronomers and astrophysicists.

No attempt will be made in what follows to discuss in detail anything other than types I and II since the great majority of supernovae appear to fall within these two categories. It should be noted in passing, however, that type V—of which only a very few have been observed—are anomalous events in relation to other supernovae. For one thing, they can remain quite bright for a much longer period than do the others. One, for example, remained this way for at least thirty years. The only reasonable explanation for such a long continuing brightness is the release of an absolutely fantastic amount of energy—much more than is released by types I and II.

Supernovae are classified as either type I or type II on the basis of their light curves and their spectra. Representative light curves are shown in Figure 2. The light curves of type I are remarkably consistent but there is some variation in the shape of the type II light curves. A type II supernova is usually about two magnitudes fainter than a type I. While the spectrum of any supernova is extremely difficult to interpret, there is a basic difference between those of type I and type II. A type I spectrum shows an almost complete lack of hydrogen while a type II spectrum shows an abundance of this element.

Type II supernovae have been observed only in spiral galaxies of the types Sb and Sc (see Figures 3 and 4). Also, as a rule, they are found only in the arms of the spiral. Whether they are limited to spiral systems is as yet unknown. On the other hand, type I supernovae are found in all types of galactic systems, but appear to favor elliptical galaxies.

Type I supernovae are 10 to 100 times more energetic than type II. During a type I supernova considerably less than one solar mass* of material is normally ejected from the star whereas a type II supernova typically ejects several solar masses or more. Consequently, type II supernovae are thought to occur in stars many times more massive than the sun while type I appear to be limited to stars only slightly more massive than the sun.

This evidence strongly suggests that type I originate in population II stars, i.e., those that are relatively

*The mass of the sun is used as a standard unit of stellar mass.

Fig. 3. Spiral galaxy NGC 4725 in COMA BERENICES. The view without the supernova was taken May 10, 1940 while the supernova is shown as it appeared January 2, 1941. The white line shows the location of the supernova.

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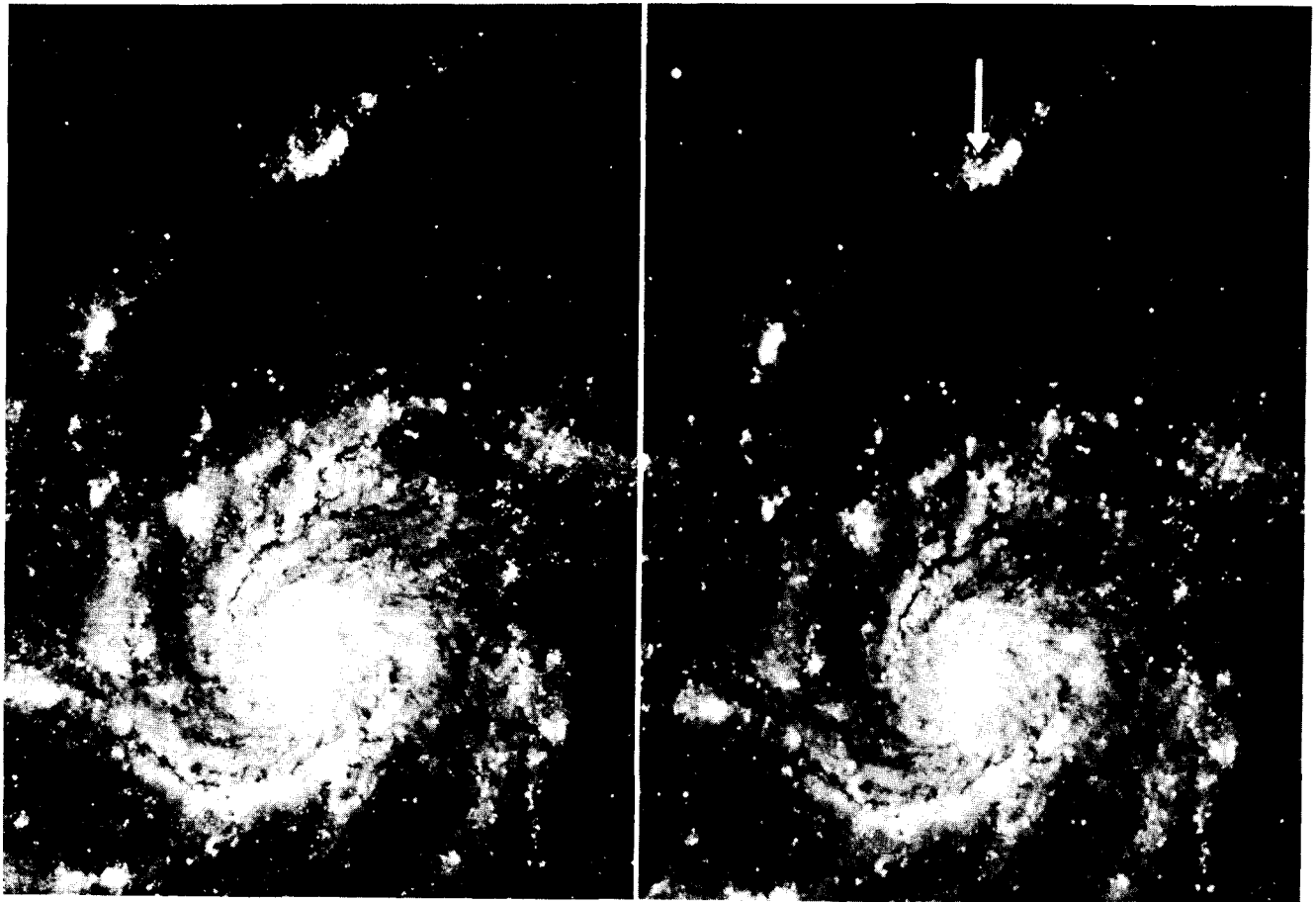

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old. The stars in the elliptical galaxies are known to be at least a billion years old, and there is little evidence of any new star formation within them since about the time they were formed. Population I stars, which are comparatively young—less than a hundred million years old—and appear to be in a continuous process of formation, are thought to be sources of type II supernovae. Figure 5 shows a comparison of population I and population II stars.

To understand the mechanisms that have been suggested to explain type I and type II supernovae it is first necessary to know something of how stellar evolution is believed to occur. The best place to start is with the Hertzsprung-Russell diagram.

If the distances to various stars are accurately known, their absolute magnitudes—or luminosities—and their surface temperatures can easily be calculated. When the absolute magnitude is plotted against the surface temperature for stars of known distance, an H-R diagram such as that of Figure 6 results. The diagram is, in effect, a chart of these stars which shows their present stage of evolution. As can readily be seen from Figure 6, most stars fall on the main sequence. They stay there during most of their stable hydrogen-burning* evolution. Supernovae apparently do not occur in stars on the main sequence.

Fig. 4. Type Sc spiral galaxy NGC 5457 in URSA MAJOR. The supernova shown occurred far out in one of the spiral arms. This appears to be the general rule with type II supernovae.

It was once thought that stars evolved along the main sequence from the lower right to the upper left. It is now known, however, that stars evolve onto the main sequence early in their lives and leave it when they are relatively old. The evolutionary track of a star several times more massive than the sun is shown in Figure 7. The time during which a star is most likely to go supernova is during the transition from the red giant to the white dwarf stage. We have no evidence of a continuous evolutionary sequence coming across from high right to lower left in the H-R diagram even though it is shown as such in Figure 7. The problem is that, if you surround a white dwarf by even a small amount of material containing hydrogen, which can convert to helium, the star appears to an observer as a giant far to the right in the H-R diagram. Indeed, as Fred Hoyle has stated, a giant is nothing more than a white dwarf in the middle surrounded by an envelope in which nuclear fuel is being burned.

The transition from giant to dwarf must be extremely fast by astronomical evolutionary standards. In the process, the star is required to lose a considerable amount of mass. Although there are various mecha-

*Conversion of hydrogen to helium by thermonuclear processes.

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nisms by which this mass loss can be achieved, it is now certain that with respect to some stars it occurs through a supernova explosion.

The point occupied by a star on the main sequence is dependent on its mass. The more massive stars occupy the upper left part of the main sequence while those less massive than the sun are found to the lower right. As shown in Figure 8, the more massive a star the higher on the H-R diagram is its evolutionary track on leaving the main sequence.

A star's location on the main sequence is also an indication of how rapidly it will evolve away from the main sequence. A star the size of the sun will remain on the main sequence for as long as ten billion years whereas a very massive star—60 to 100 solar masses—will leave it within a million years or less. There is considerable evidence to show that a star of more than 100 solar masses is inherently unstable and may explode before or very soon after it reaches the main sequence. The most massive stars yet discovered are about 65 solar masses in size. It may be that certain of the type II supernovae result from the detonation of objects that are simply too massive to be stable on the main sequence.

But most type II supernovae are believed to occur in massive population I stars which, while young in comparison to, for example, the sun, are far advanced in their evolutionary path.

Fred Hoyle and William A. Fowler have set forth the most comprehensive explanation yet given for supernovae explosions. They believe that the sudden fusion of a nuclear fuel is the source of energy for the explosion. This means that a sufficient amount of the fuel must be present and it must be capable of yielding an adequate energy supply in a time interval less than the explosion time scale of the star.

Fusion of hydrogen either with itself or with other light elements such as carbon, nitrogen, oxygen, and neon can theoretically yield the energy necessary for a supernova explosion. Massive stars still have great quantities of hydrogen present when they evolve to the latter part of the red giant stage, but the same is not necessarily true of stars with masses near that of the sun. Thus, if hydrogen burning can somehow be triggered on a gigantic scale, this could account for the energy necessary to produce a type II supernova but not for that required for a type I. Stars from which type I supernovae originate probably do not have a sufficient amount of hydrogen left.

Hoyle and Fowler, moreover, have raised a basic objection to hydrogen fusion as the source of energy

Fig. 5. Stellar Populations I and II. These views of Andromeda and NGC 205 were taken with the 200-inch telescope at Mount Palomar. Andromeda is one of the nearest companion galaxies to the Milky Way.

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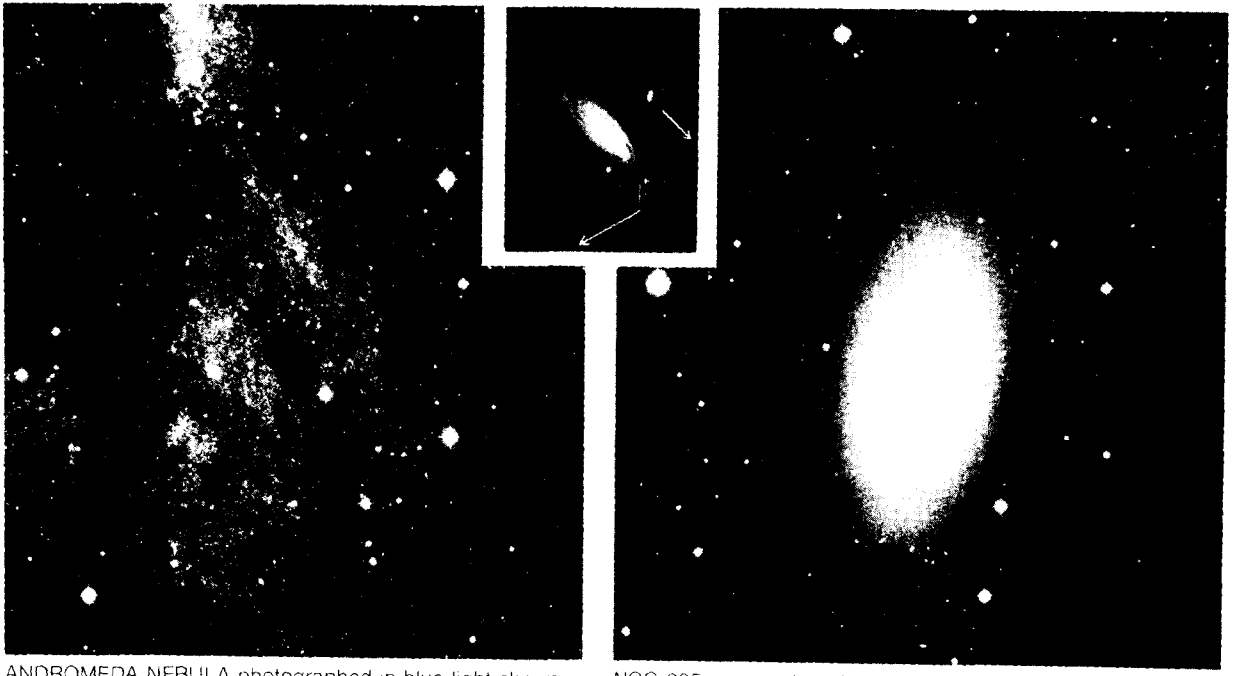
STELLAR POPULATIONS I AND II



ANDROMEDA NEBULA photographed in blue light shows giant and super-giant stars of Population I in the spiral arms. The hazy patch at the upper left is composed of unresolved Population II stars.

NGC 205, companion of the Andromeda Nebula, photographed in yellow light shows stars of Population II. The brightest stars are red and 100 times fainter than the blue giants of Population I.

The very bright uniformly distributed stars of both pictures are foreground stars belonging to our own Milky Way system.

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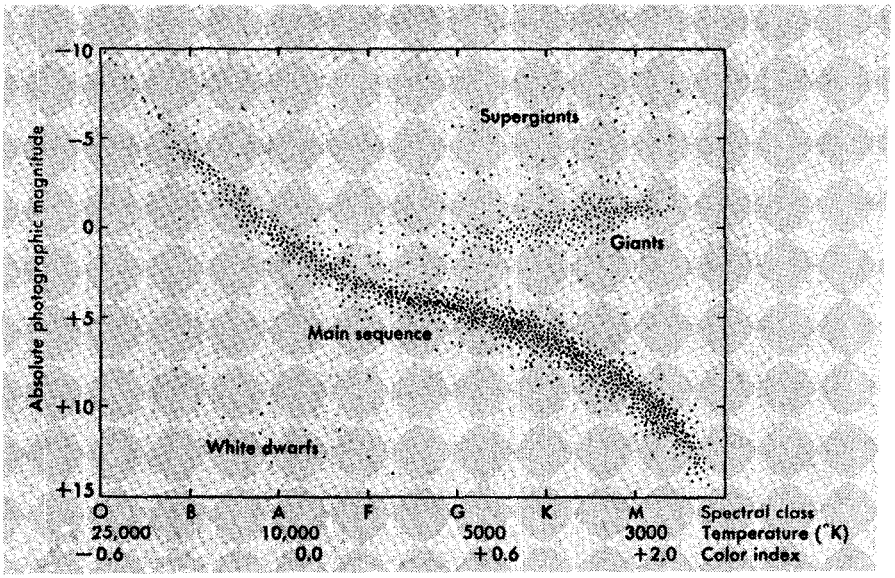

Fig. 6. The Hertzsprung-Russell diagram for stars of known distance. A diagram such as this is indicative of the present evolutionary status of the stars shown. Apparently supernovae do not occur in stars that are on the main sequence. The sun is located on the main sequence at G5.

(George Abell (1966) *Exploration of the Universe*. Holt, Rinehart and Winston, New York, p. 405.)

for any supernova. According to their argument, the time scale for major stellar explosions is characteristically of the order of 1-100 seconds. But hydrogen fusion reactions, of whatever variety, simply cannot occur sufficiently rapidly to supply 10^{50} ergs—the amount of energy typically required—within this time scale. Therefore, they have looked to some other fusion reactions as the source of the observed energy.

They have found their source in the light nuclei other than hydrogen that exist in very substantial quantities in stars that are well advanced in their evolution. At sufficiently high temperatures—more than a billion degrees K—these nuclei undergo fusion reactions well within the time scales required and are capable of releasing more than the amount of observed energy. Carbon-carbon reactions occur readily, as do oxygen-oxygen reactions, and fusion of helium with light nuclei such as neon. These reactions require extremely high temperatures, however, so that a mechanism is necessary to explain how large quantities of the light

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nuclei can be rapidly exposed to temperatures considerably greater than a billion degrees K. The exposure must occur within a matter of seconds or the star will reorient its internal structure sufficiently to avoid a catastrophic detonation. One of the great successes of the Hoyle-Fowler theory is its ability to explain how these light nuclei can rapidly—on the order of 10 seconds—be heated to several billions of degrees.

Consider now a star about 30 solar masses in size that has just become a red giant. About 10% of its hydrogen has been converted to helium at the time that it leaves the main sequence. This helium comes to comprise the core of the star because of its difficulty in mixing with hydrogen. Hydrogen burning continues in a shell around this core so that it gradually grows larger as more hydrogen is expended.

No thermonuclear reactions are going on in the core but it grows hotter and hotter because of gravitational contraction as more helium is added to it. Indeed, it is the rather sudden rise in temperature of the core because of this contraction that heats up the hydrogen envelope and causes it to expand enormously, thus producing the red giant.

Unless it is under tremendous pressure helium will not undergo thermonuclear reactions even at 10 billion degrees K. However, such pressures soon come to exist in the core so that the helium reaches a density of about 100,000 g/cc and a temperature of 100 million degrees K. Under these conditions, helium burning begins and ultimately three helium atoms combine to form the stable carbon isotope ^{12}C. As the temperature and pressure increase, this isotope can in turn react with another helium atom to form the oxygen isotope ^{16}O.

Eventually the center of the core is filled with ^{12}C, ^{16}O, or a mixture thereof. As the core continues to contract, these in turn start to burn. A number of intermediate mass nuclei such as ^{20}Ne, ^{24}Mg, ^{28}Si, and ^{32}S are formed. Once these are produced, simple fusion reactions no longer occur; however, when the core temperature reaches about three billion degrees K, an involved chain of reactions begins which rather rapidly leads to the formation of ^{56}Fe and isotopes of other elements near this isotope of iron. But it is the ^{56}Fe that we are primarily interested in.

It turns out that this is an exceptionally stable isotope and as the reactions continue a very considerable amount of it is formed within the core. Further, it will not "burn" as the lighter elements in the core have. But gravitational contraction inexorably continues and causes the core to get even hotter. Our star now has an iron group core at a temperature greater than five billion degrees while the potentially explosive lighter elements lie well out from the center at temperatures less than 1.5 billion degrees.

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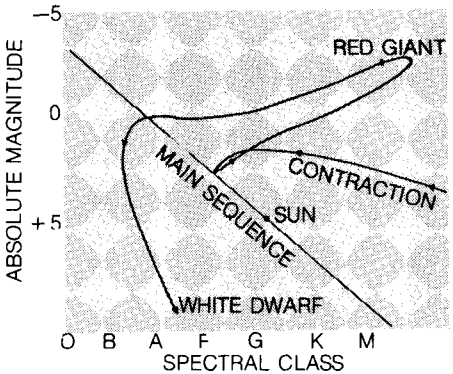

Fig. 7. Evolutionary track followed by a star several times more massive than the sun.
(Thorton Page and Lou William Page (1968) *The Evolution of Stars*, The MacMillan Co., New York, p. 259.)

As gravity continues its work the core gets ever hotter and denser until suddenly and catastrophically—at a temperature on the order of eight billion degrees—the ^{56}Fe is converted to a mass of helium atoms and neutrons. This reaction is endoergic—that is, it absorbs energy rather than producing it. Because it occurs on a massive and almost instantaneous scale, it literally refrigerates the core of the star. Heat that had been used to hold the outer portions of the star in equilibrium against the tremendous pull of gravity is now used in the destruction of ^{56}Fe. As a consequence, within about one second the envelope of lighter elements implodes upon the core.

Within another few seconds the dynamical energy of the in-falling layers is converted to heat so that the light elements, e.g., carbon neon, oxygen, et cetera, but primarily oxygen, in these layers are heated to the point where vast numbers of explosive fusion reactions occur. These explosive reactions literally blow a large portion—if not all—of the envelope away from the core. The result is a type II supernova.

Actually it's not quite as simple as this brief summary makes it appear. The evolution of a star into a type II supernova is shown in Figure 9. It turns out that some braking action is required to slow down the oxygen mantle so as to keep it from imploding along with the inner core before it can burn and produce enough energy for the explosion. This braking action is perhaps supplied by rotation, internal turbulence, or an entrained magnetic field. Without it, however, it is unlikely that a supernova explosion will occur even though there is catastrophic collapse of the inner core of the star.

Although we started out with a star having a mass equivalent to 30 solar masses as an example, Hoyle and Fowler have calculated that the sequence of events just described can occur in stars having masses as low as 10 solar masses but no lower. Therefore, if their theory is correct type II supernovae can only occur in stars at least ten times more massive than the sun.

The situation is vastly different in a type I supernova, however. Recall

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that supernovae of this type occur in stars that are much older than the stars from which type II occur. Therefore, these stars must be much smaller and their evolutionary history considerably different.

Paradoxically, it seems that type I supernovae occur in stars that are much older but not nearly as far down the evolutionary track as those that produce type II supernovae. Hoyle and Fowler base their explanation of type I supernovae on the following premises. In a very massive star, the core may evolve to the iron group while there are still large quantities of hydrogen, helium, carbon, and oxygen distributed in successive layers from the surface of the star inward. Further, the core contracts to densities and heats to temperatures at which catastrophic implosion can occur while all these elements are still abundantly present in the envelope. The same is not true for a population II star only slightly more massive than the sun. In such stars there may be layers of different elements but the outermost layer will have evolved almost completely to helium long before core content, densities, and temperatures exist in combination which can trigger the implosion.

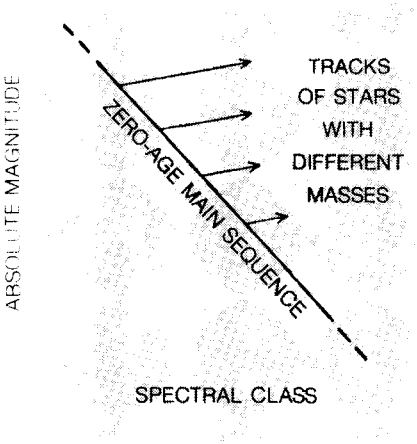

Fig. 8. The more massive a star, the higher in the H-R diagram is its track on leaving the main sequence, and the more rapid is its evolution.

(Dorrit Hoffleit and Lou William Page (1968) *The Evolution of Stars*. The MacMillan Co., New York, p. 259.)

Hoyle and Fowler, therefore, believe that type I supernovae occur during the white dwarf stage when the matter of the star has contracted to an incredibly dense state but the center of the core is still at temperatures less than four billion degrees. As a white dwarf evolves and continues to contract, thus causing its matter to become more and more condensed, a stage may be reached in which the major part of the matter becomes degenerate. When this occurs, the electrons for all intents and purposes become frozen; they can no longer move. Only the nuclear particles can still move at random, and they are so tightly packed together that the density of the star's matter approaches one million g/cc.

A strange property of degenerate matter is that it does not expand with an increase in temperature the way ordinary matter does. Remember our red giant? When its core heated up due to gravitational contraction,

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the hydrogen envelope expanded immensely. The expansion provided a cooling effect which counterbalanced the heating so that an equilibrium state was reached. Not so with degenerate matter. It cannot expand to release the heat. But any slight increase in temperature increases the rate of fusion of light nuclei. In degenerate matter this in turn raises the temperature still further and a snowballing effect quickly occurs. The result is a type I supernova.

According to Hoyle and Fowler, the temperature rise need not be great in order for a type I supernova to occur in a star consisting largely of degenerate matter. They believe that a rise from 1.5 to 2 billion degrees K would be amply sufficient to induce the explosion of the light elements. Their calculations show, however, that the right conditions of degeneracy and temperature can occur only in stars having a mass in the range of about 1.2 to 1.5 solar masses. Degenerate stars within this mass range explode well before their inner regions reach an evolutionary stage where catastrophic implosion could take place.

The explanation offered by Hoyle and Fowler for supernovae of types I and II does not imply that all stars larger than 10 solar masses or in the range of 1.2 to 1.5 solar masses will inevitably become supernovae. But it does suggest that stars of certain masses will never become supernovae. There has not been much argument among astrophysicists and astronomers concerning the stability of stars having a solar mass or less, but there is a dispute as to the mass range between 1.5 and 10 solar masses, W. David Arnett, a Cal Tech astrophysicist, for example, believes that stars of intermediate mass—4 to 9 solar masses—may ignite the $^{12}C + {}^{12}C$ reaction explosively because of the high degree of electron degeneracy in their central regions.

It should be emphasized that a number of other mechanisms which can lead to supernovae have been suggested. Nonetheless, there seems to be a consensus that the Hoyle-Fowler approach can explain the great majority of supernovae that have been thus far observed.

One problem faced by astronomers and astrophysicists in attempting to explain how supernovae occur is their inability to see what is left behind after a supernova. The Crab Nebula (Figure 10) provides a magnificent view of the material thrown off by a supernova. The Veiled Loop in Cygnus (Figure 11) is also such a display. However, with the possible exception of a supernova first observed in August 1937, no stellar remnant has been observed telescopically after the light of the supernova has faded. The object left after this 1937 explosion is of the 23rd magnitude so that it can only be observed through the 200-inch telescope at Mount Palomar. Even with this instrument the object is so faint

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that little useful information has been obtained concerning it.

Although the expanding cloud of gas that makes up the Crab Nebula is still spectacularly visible some 900 years after the detonation, evidence of supernova remnants become unobservable by telescope (see Figure 12). Fortunately, astronomers have another means of observing such remnants even after they disappear from telescopic view. It's called radio astronomy. All known remnants of supernovae are radio sources. Indeed, it was the discovery of Cassiopeia A as the second strongest radio source in the sky—after the sun—that led to its ultimate determination as the site of a supernova.

The discovery in 1968 of pulsating radio sources—which quickly came to be known as pulsars—has in particular shed new light on the enigma of the supernova.

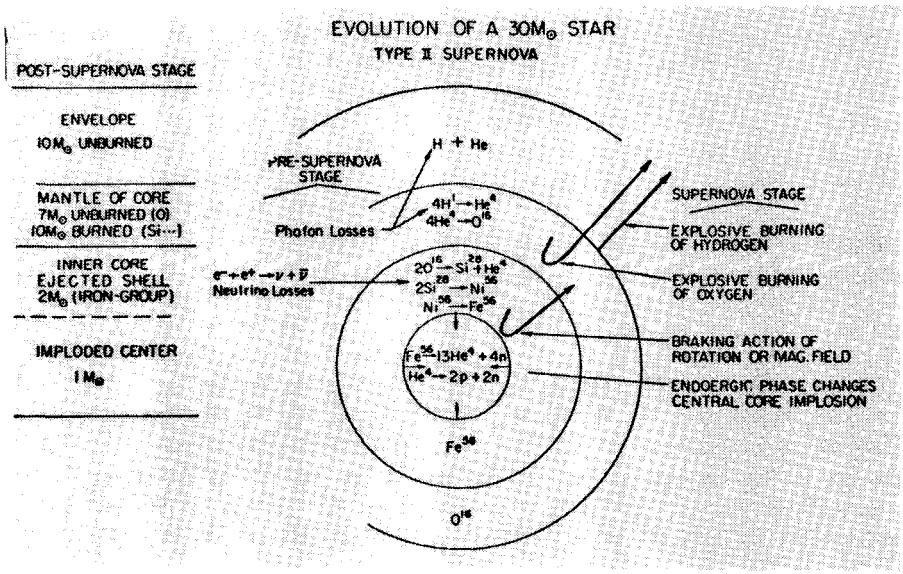

Fig. 9 The evolution of a star 30 times more massive than the sun illustrating the pre-supernova, type II supernova, and post-supernova stages. It is assumed that braking action due to rotation or some other mechanism ultimately leads to mantle-envelope explosion following core implosion caused by endoergic nuclear phase changes. The explosive burning of previously unburned oxygen is taken to be the source of energy of the explosion.

(William A. Fowler and F. Hoyle, (1964) Ap. J. Suppl. 91 9 201.)

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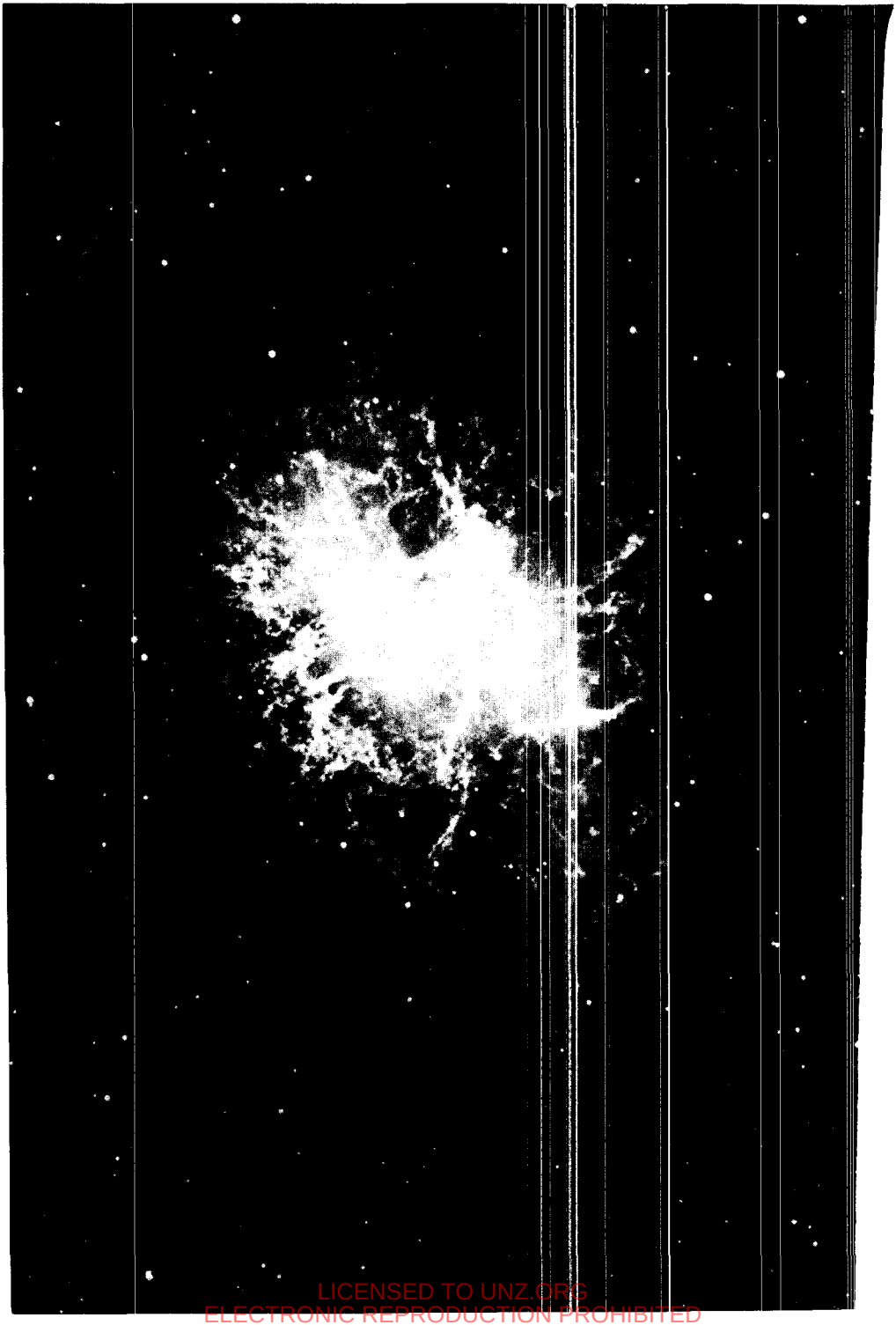

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Astrophysicists have long postulated that after the explosion of a supernova a very dense core might still remain. This core might have a diameter of only ten miles and still contain as much mass as the sun. Under these conditions, the object would have a metallic crust at a temperature of almost a billion degrees K. It would have a fluid core so dense that it no longer consists of individual atoms. Rather, the gravitational forces are so high that electrons and protons combine to form neutrons and the neutrons act in as degenerate a manner as the electrons in the degenerate white dwarfs mentioned earlier. In a neutron-rich star of this kind a piece of matter the size of a pinhead would weigh a million tons.

The pulsars are now thought to provide direct evidence of the existence of these so-called neutron stars. The discovery of a pulsar within the Crab Nebula lends strong credence to this view. It also suggests an answer for one of the strangest anomalies present within the nebula—besides its radio wave emission, it also gives off far too much light and X rays to be accounted for by the energy of the original supernova. Consequently, there must still be some source of energy emitting within the nebula.

Fig. 7-6. The Crab Nebula. This is the most studied object in astronomy and represents the remains of the supernova of 1054. This view was taken in red light with the 200-inch telescope at Mount Palomar. When photographed in blue or polarized light, the filamentary material shown assumes greatly differing appearances.

If a pulsar is, in fact, a rapidly rotating neutron star—as has been hypothesized by T. Gold—then it is quite possible that the star has a cloud of gas and a magnetic field associated with it. As the star rotates, the charged particles of the outer edge of the gas cloud are accelerated to near the speed of light and flung away into the diffuse mass of the nebula. These particles radiate and may well supply the observed optical and X ray emissions.

It is likely that over the long term supernovae have played two extremely important roles in the evolution of the earth and its inhabitants. Supernovae now appear to be the source of (1) a substantial part of all elements heavier than iron, and (2) the cosmic rays that continually bombard the earth.

As has been implied earlier, it is well demonstrated that elements with masses up to about 60 can be produced in substantial quantities in red giants. It has further been established that elements of much greater mass can be synthetized within these stars. This occurs by a process of neutron capture. This capture process is slow, however, taking between a thousand and a million years. While a great many of the isotopes

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of the heavier elements are produced by this so-called s-process, it cannot account for the presence of the heaviest naturally occurring elements, i.e., thorium and uranium. The required intermediates in the build-up of these two elements have half-lives that are much too short. They disappear before neutron capture occurs by the s-process.

The answer to their existence lies in the supernovae. Under certain conditions of very high neutron flux, neutron capture occurs extremely rapidly. This r-process finds the appropriate conditions in a supernova where a tremendous flux of neutrons exists. During the time span of a supernova explosion—about 100 seconds—more than enough neutron captures can occur to form thorium and uranium and even much heavier—but less stable—elements.

There is evidence that the r-process does indeed occur in supernovae. The light from a type I supernova decays in approximately exponential fashion in 50 to 60 days. This decay corresponds to the spontaneous fission half-life—56 days—of californium-254. It is quite possible that what we see, therefore, represents nuclear energy released by this spontaneous fission.

Presently supernovae provide the only plausible explanation for the finite amounts of thorium and uranium that exist within the solar system. Presumably the system was formed from a mass of interstellar gas and dust composed in some part of material driven off from supernovae. A recent letter to the British journal *Nature* suggests that about 10% of the heavy elements formed in a supernova condenses into solid particles during the expansion phase following the explosion. From particles such as these produced billions of years ago our earth was in large measure formed.

Cosmic rays consist primarily of protons* and alpha particles*, with about 1% being a mix of ionized elements up to an atomic number of about 30. These particles are constantly bombarding the upper reaches of the atmosphere. Most are absorbed there, but some are energetic enough to reach the surface. This is particularly true at higher elevations. The important thing about cosmic rays is that they represent ionizing radiation and hence can cause genetic mutation.

It is generally accepted today that supernovae are the primary sources of cosmic rays. A problem is that the intensity of the particles striking the earth has not changed appreciably over the last ten thousand years. Since supernovae occur rapidly, it would seem that the cosmic rays

*Ionized hydrogen and ionized helium respectively.

Fig. 11. The Veiled Loop in Cygnus. This filamentary nebula is also believed to be the remains of a supernova. The photograph was taken in red light with a 48-inch Schmidt telescope.

HALE OBSERVATORIES

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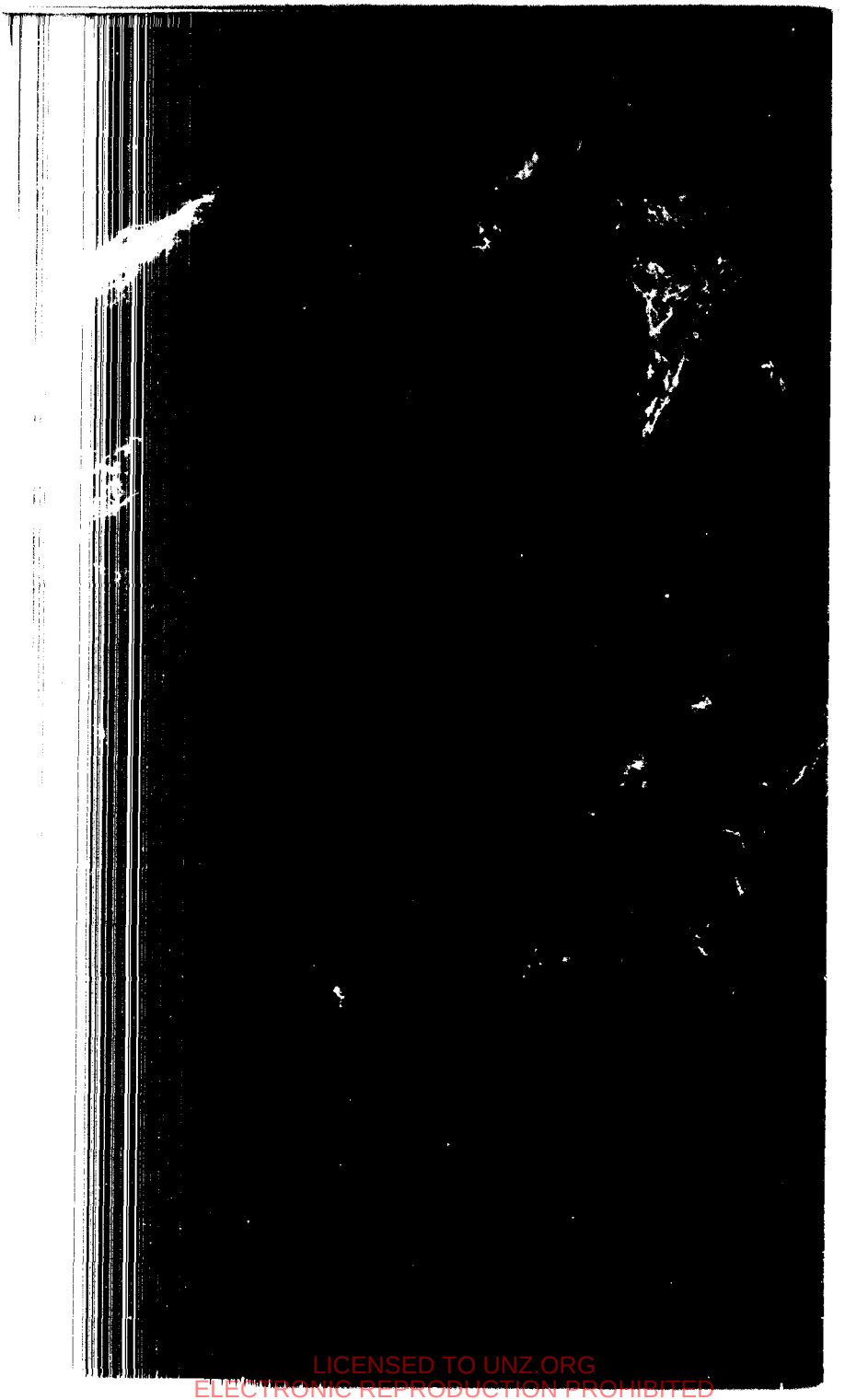

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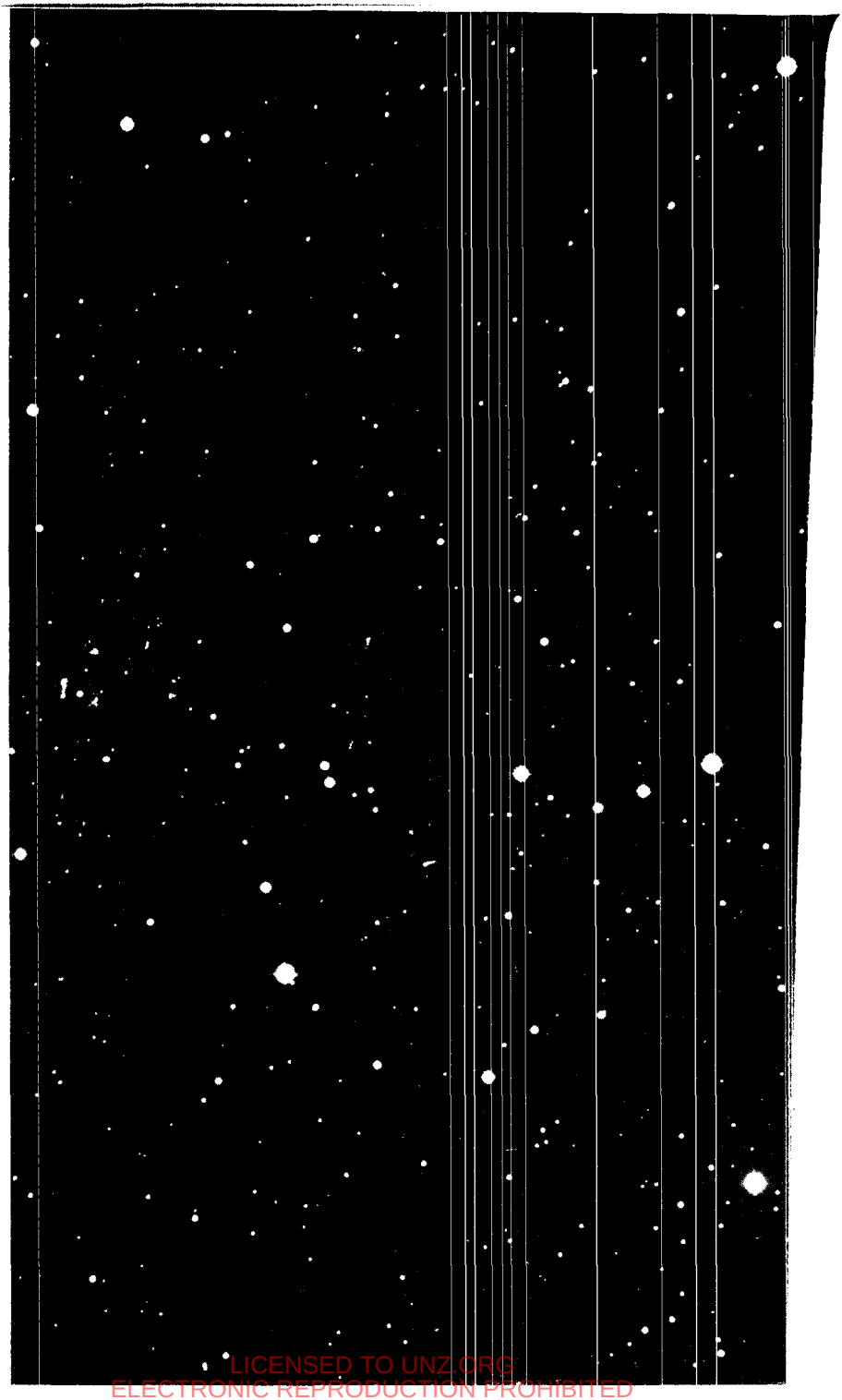

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should strike the earth's atmosphere in bursts as first those from one supernova and then those from another arrive. In other words, there should be a very considerable variation in the intensity from time to time.

A quite good answer for the constancy of the particles has been derived, however. They are charged and so will interact with galactic magnetic fields. They must also diffuse through interstellar matter. This causes them to spread out, assume differing energies and arrive at the earth over varying times. There are enough supernovae randomly distributed within our galaxy* to thus account for the general temporal and spatial constancy of cosmic rays.

Statistically it can be shown that in the eons that have passed since life first appeared on this earth numerous supernovae must have occurred within several hundred light-years. The nearest supernova of which we have visual evidence is that which formed the Crab Nebula 5,000 light-years distant. That's much too far away to affect the earth in any direct sense. The same is not true of supernovae occurring within several hundred light-years.

An argument has been made that for very close-in supernovae—100 light-years or less—a burst of cosmic rays could arrive at the earth over a period of a few days with intensities sufficiently high to either kill or sterilize various types of life. The net result would be direct extinction of some species by radiation. This argument is severely criticized by most astrophysicists on the grounds that even for very close-in supernovae the cosmic rays would not arrive in bursts—for the reasons mentioned earlier—but would be spread out over a very appreciable time and hence would have much lower intensities.

It is, therefore, most unlikely that a close supernova has led to the *direct* extinction of species in the past. But indirect extinction cannot be ruled out. The Russian astrophysicist Shklovsky has calculated that a type II supernovae 32 light-years from the sun could bath the earth with cosmic rays having an energy density 100 times that of the cosmic rays that now impinge upon the atmosphere. The amount of the cosmic rays would also increase 30 times, and this would last for 30,000 years.

*Supernovae are thought to occur about once every three to four hundred years in the average galaxy. The Milky Way, however, of which we are a part, is a very large galaxy and supernovae are believed to occur within it on the order of once every hundred years or less. The reason we do not see more than we do is that the light from them is absorbed by the great masses of interstellar gas and dust within the galaxy.

Fig. [illegible] The rest of the radio source [illegible] photographed in red light. A supernova occurred here [illegible] ago, but almost no filamentary gas can be seen visible. The disappearance from view of the ejected matter is as evidenced by this photograph is thought to be the usual case with supernovae. The Crab is taken to be exceptional in this respect.

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The radioactivity of the lowest atmospheric layer is currently about 0.12 roentgen per year. Two-thirds of this is contributed by terrestrial factors, i.e., radioactivity of the earth's crust and nuclear activities by man, but the remainder is due to cosmic radiation. Increasing the intensity of cosmic rays by 100 times means a thirtyfold rise in the mean radioactivity at the earth's surface. Shklovsky believes that this, lasting for thousands of years, may well have had catastrophic consequences for many plants and animals because of a much increased rate of mutation. In fact, this has been offered as one explanation for the dying out of the reptiles at the end of the Cretaceous period.

We now have substantial evidence that supernovae have occurred near the solar system. A 1969 article in *Nature* reveals that a number of pulsars are located at points nearer than the Crab Nebula. Since these are believed to be supernovae remnants, they are taken as concrete evidence of nearer explosions. One, located about 450 light-years away, is at the site of an explosion that occurred roughly 60,000 years ago. Another, a mere 190 light-years away, seems to show the location of a star that exploded about 440,000 years ago.

With regard to this latter supernova, measurements of the activity of ^{10}Be and ^{26}Al produced by cosmic rays in oceanic sediments show an increase of about 100% in the average activity at a sediment depth of 83-110 centimeters. Depending on the sedimentation rate, this suggests an increase in comparable magnitude in the cosmic-ray intensity 200,000 to 600,000 years ago. Within these rough measurements, there is a clear possibility of a correlation between the supernova and the cosmic ray increase.

We may thus assume that supernovae have played an important—if not critical—role in the evolution of life on this planet. Shklovsky goes even further and raises the possibility that a high level of radioactivity, caused by supernovae occurring a billion years ago, may have stimulated the formation of highly complex compounds from simple organic compounds, and life may have developed on the basis of these complexes.

A literal interpretation of the bible declares that life will end on this earth in a rain of fire. What more natural source than the sun going supernova? We can, therefore, speculate that life began as the result of a supernova and will end the same way.

Most astrophysicists would disagree, however. While they would not want to comment on how life began, under our present state of knowledge, most would privately state that the sun is a lot more stable than man. If the end is to come in a rain of fire, it is more likely to be through a nuclear holocaust of man's own making rather than because the sun has exploded. ■

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Joseph Green The Crier of Crystal

Convincing a man of something he knows is
impossible involves the truth of
"I wouldn't believe it if I saw it with my own eyes!"

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Conscience Allan Odegaard heard a brittle tinkling, a loud warning sounded by elfin chimes, as his pursuer brushed a crystalline flowering plant. He stopped at the end of a small clearing and turned to confront the danger. This deaf hunting animal had been on his trail for several minutes.

It was going to be close. The vegetation was thick and the carnivore would appear only a few meters away. Allan drew the spare pistol with his left hand and held it ready for a second shot. Bodies composed of siliceous tissue resisted even the cutting heat of a laser, and the small crystal in a handgun had to cool five seconds between pulses. Cappy Doyle had told him the scientists at this isolated research station always carried two weapons when working in the jungle. The ability to fire twice had saved lives that would have been lost in five seconds.

The powerful infrared lamp on the helmet of Allan's protective coverall sent a broad beam across the small open space, illuminating the wall of brush on the opposite side. His goggles, ground to accept wavelengths in a narrow band around the 10^{12} frequency, kept out all visible light. The infrared beam did not reflect off crystalline, or glass surfaces, as badly as white light, and he could see clearly.

The sounds of pursuit stopped. There was a slow movement at the rear of the clearing as a large head approached the edge of the brush. The hunter paused, testing the wind, unaware that it could be seen by its intended prey. The huge mouth was open, and Allan saw a round silver tongue curling over pyramid-shaped teeth of unbreakable glass. And then a strong breeze started behind the human's back and carried his odor directly to the animal. They were so close he could see the skin crinkling around the flaring nostrils, hear the snuffling sound of heavy intakes. And then the wrinkled flesh smoothed out, and Allan knew with the certainty gained from encounters with strange beasts on a hundred worlds that it was not going to attack. To the carnivore his strong scent indicated a mistake. It signaled that he was not only alarmingly strange, but inedible.

Allan had a sudden dangerous impulse and yielded to it immediately, before reflection cost him his chance. He bolstered the left-hand gun and pulled down his goggles.

It was like opening a doorway into the softly lighted heart of a diamond. This planet had no moon, but stars hanging thick and close in the clear night sky provided a diffused illumination. Crystal was a unique world, where life had evolved with silicon instead of carbon as the anchor element. The proportions of hydrogen and nitrogen in living tissue were similar to his own, but the oxygen content had dropped from 76 to 68 percent and been replaced by metallic elements. Physically the planet was a virtual twin of Earth, and the

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structure and activity of its flora and fauna amazingly similar. But what on Earth would have been a tree became on Crystal a giant chandelier, with a trunk of shimmering crystal and leaves of tinted glass. The wind-rippled branches covered with innumerable tiny jewels, bending plant tissue where the metallics in every scale of bark colored the light and reflected it from a thousand glistening facets. In the daylight it was blinding, a visual fury of changing light of every color and intensity. A minute of open-eye exposure would burn out the color receptors in the fovea; five would blind a person. No one went outdoors without goggles similar to the ones he was wearing, ground to admit only a few wavelengths.

Even in the softer starlight the display was dazzling. After a few seconds Allan recognized the head of the hunter by the pattern of the teeth, glittering like diamond pyramids in what to the animal's protected eyes seemed shadow. And as Allan watched the mouth that could cut him in two with one bite, slowly closed and the head receded, fading from view. There was a low sibilant rustling as hanging vines of vitreous crystal parted, and the fading sounds of padded feet on blades of glass.

Reluctantly Allan pushed the goggles back over his eyes, and the visually dangerous beauty around him faded. The silence also died as the small jungle creatures who had quietly awaited the outcome of the stalk went back to their nightly business. And Allan had to return to his. He lived for moments like these, when some strange beauty burst on senses dulled by the monotony of months in space, or his work threw him into a situation so startling and new it surpassed previous human experience. But as a Practical Philosopher he had a job to do, and little time in which to accomplish it. A Space Service neverlander was due next day, bringing World Council Member Celal Kaylin of Turkey, chairman of a subcommittee checking on the work of the P.P. Corps. Allan had been on his way to Earth for a needed vacation prior to testifying before the committee when he was unexpectedly ordered to Crystal. The scientists there had reported that an elusive creature they had been unable to capture was possibly intelligent. And Council Member Kaylin was going to accompany Allan on this assignment and observe a "Conscience" in action.

As Allan started forward again, hearing the brittle crunch of small plants breaking beneath his thick boots, the Crier called from close ahead.

Cappy Doyle, the station director, had played several recordings of the thin, plaintive voice for Allan. It sounded like a high-pitched child who understood a few words of English and used them interspersed throughout a string of gibberish. But one word that had been consistently

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repeated was "help," and another was "leave." Once they had recorded a clearly heard, "Help us; leave." The voice always spoke from the same area, at night, and when the wind was still. Limited vision and numerous carnivores who killed before they realized their prey was inedible kept night work in the jungle to a minimum. Two heavily armed parties had sought the elusive voice without success, and several daylight searches of the area revealed nothing. Allan was no braver than the resident biologists, but he had dared the night jungle alone because experience had taught him shy creatures on the verge of intelligence were less likely to flee from a single person. And he did not want to keep the subcommittee chairman waiting while he made that first careful contact with the frightened Crier.

The sound came again, and Allan pushed away yielding fronds of spun glass and moved slowly ahead. He made no attempt to walk quietly because it was impossible. What on Earth would have been a silent walk sounded on Crystal like a mad giant trampling on greenhouses. But the local fauna were equally noisy; every bird that landed on a branch, every insect blundering into a leaf, spread its own small circle of sound. It hardly mattered for most of them; only a few had hearing organs.

The wind died and the Crier called again, a long wail that lasted over a minute. Allan stopped and listened carefully. He picked out the words "leave" and "difficult" in the jumble of sounds . . . and received a strong impression there were syllables of other words in the mixture.

Allan took a few more careful steps, stopping when he judged himself within a few meters of the creature. He waited, light focused directly ahead. He saw nothing, and heard only the crystalline chiming of vegetation shaking in the breeze. The vagrant wind gradually faded, and almost immediately the sound came again, so close it startled him. He was facing a bush a little taller than himself. Out of its shadows a high voice cried, *"Leave us!"*

Allan felt the hand still holding a laser tremble, and eased his finger back from the trigger. The distinct words were followed by nonsense, and he strained his eyes to find the speaker. When he still saw nothing he took a step forward. The bush he was searching had a slender trunk and straight branched limbs with only a moderate number of leaves. No animal larger than a very small bird could be hiding there.

Another gentle wraith of a night wind appeared, and the voice stopped. Allan strained his eyes, and when the breeze faded and the sound came again he finally saw the Crier.

At almost eye level with the human one branch crossed beneath another. A saucer-shaped leaf, laced with silver threads, hung from the upper limb and grew into the lower; the normal growth pattern on both

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branches was upward. Two thick coils of silver wire, spun fine as spider silk, hung suspended in the air on both sides. The supple limbs, when not disturbed by the wind, kept the leaf pulled taut to form a crude but workable diaphragm. As Allan stared, almost unable to believe his eyes, the leaf vibrated and the thin voice uttered a string of gibberish.

The leaf and coils formed an electrically operated speaker. The Crier was the bush itself.

"A *mountain* of silver?" Allan asked, astonished.

Cappy Doyle laughed, his thin form shaking slightly in the locally-made glass chair. A supply ship had failed during the station's first year and the personnel had almost starved. Cappy, who had arrived middle-aged and plump, had chosen not to regain the lost weight. "Yes, a mountain, according to our seismic readings. This little hill we are sitting on is just the top of the peak, with the rest deep underground. We've done some mining and smelting as hobby work. By using silver instead of lead in stained glass you can get some very beautiful effects, as you see in our windows."

The research station windows justified the director's pride. The standard dome of poured foamfab had been modified by adding thick but narrow panes of stained glass. If the sublimation barrier that surrounded the hilltop failed and a large animal got through, the narrow embrasures behind the windows would not admit it. The heavy coloring in the glass kept the chaotic light reflected by the crystal jungle from penetrating too strongly. From inside, the human eye saw a constant play of movement and color on the exterior of each window, a chromatic, living mosaic almost hypnotic in its intensity.

"We've found silver used in various ways in plant tissue," Cappy went on, "but the one you describe is unique. I suppose you realize that as hard-headed biologists we will have to see this speaker operate before we can accept it."

"I saw it and still don't believe it," said Allan, smiling. "But you'll have to perform your recordings and measurements in a hurry tonight. I want to substitute a better speaker for the makeshift one and try to establish communication."

The thin director shook his head, as though to clear it of incredulity, and got to his feet. "It's your show. But you realize, Conscience Odegaard, that the data we've already accumulated on silicon-based life will keep three Earth laboratories busy for a decade. And now you throw in a wild factor like possible plant intelligence . . ."

"The hazard of your profession," said Allan, also rising. "Mine is to determine whether a questionable species has developed the basics of intelligence. From the evidence so far this is going to be an easy decision. Now I'd like to get some sleep

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before our Council Member arrives."

"I'll have a crew ready to support you tonight," Cappy promised as Allan slid open the cloudy glass rectangle of his office door and stepped into the open community room. A few late risers were finishing their breakfasts at a long crystal table. Allan spoke to several of the men and women, but ignored an obvious overture to draw him into conversation. He was too tired. The Corps of Practical Philosophers was a semi-military organization and required its members to keep fit, but he was forty-one, a little on the plump side, and had landed out of cycle with Crystal and already behind on his sleep. And he was worried. The message from P.P. Administrator Wilson had been blunt and clear. Unless Kaylin could be convinced of an urgent need for the organization his subcommittee would recommend to the World Council that it be abolished. The official "Conscience of Mankind" had made numerous enemies by ruling that many potentially rich planets could not be colonized or exploited.

The P.P. Corps had been established as a civilian branch of the Space Service at the beginning of interstellar exploration. Its function was to determine if a questionable species was intelligent. No true civilization had been discovered on the thousands of worlds already explored in the Hyades, Ursa Major and Scorpio-Centaurus clusters, but many of the species ruled intelligent had very rapid growth potential. The Seals of Sister, indigenous to a planet ninety-nine percent water-covered, were linked by telepathy and together had a very powerful intellect. No simple yes or no sufficed in their case, and Allan had ruled that Sister could be colonized and the seas lowered, but the colonists must form working alliances with the Seals and help them emerge onto the land. There were many similar complex cases in the P.P. files. They were performing a vital function that prevented Man from repeating some of the atrocities simple greed had caused on Earth.

Allan tumbled into bed without bathing and slept soundly until called for dinner. In the dining room Cappy introduced him to Council Member and Mrs. Kaylin, who had arrived earlier. The C.M. from Turkey was a short, sturdy, dark-haired man, surprisingly young for such an important political appointment. His wife, Gilia, was a small, blond, and very beautiful Russian. This unusual field investigation made more sense to Allan when he learned they had signed their trial marriage contract just before leaving Earth, and that Gilia had been and still was on the C.M.'s staff. They were enjoying a honeymoon trip at World Council expense that only the very rich could afford on their own.

"Conscience Odegaard, I have heard much about your work," Gilia

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said as they shook hands. "Yours must be the most interesting job in the galaxy."

And one of the most difficult to justify," Kaylin said dryly. "Each time you throw Earthmen off a planet the demand to abolish the P.P. Corps grows stronger."

"The returns will more than pay for all sacrifices in the long run, as I hope to demonstrate here," said Allan. "Are you going to accompany us tonight?"

"We certainly are!" Gilia said immediately. Kaylin only sighed.

They ate a meal of carefully prepared concentrates—not an ounce of edible food grew on Crystal—and afterwards Allan met Carlson and Marabec, the two biologists who were to accompany them. Cappy had chosen for youth, strength, and a good shooting eye. Carlson was a large blond with long hair and a drooping mustache who looked more like a displaced Viking than a scientist. Marabec, a small, lithe Asian, was a specialist in bioelectric systems, and Allan asked his help in preparing some special equipment. It took only a few minutes to assemble the simple gear they needed. An hour after that the small expedition was ready.

Cappy Doyle had decided to personally safeguard his important visitors and joined them to make a group of six. All were wearing the protective coveralls and helmets that shielded tender skin from the cutting edges of a great deal of the glass vegetation. Allan led them down the hill to the vibration barrier at its foot, where Cappy used his key to deactivate a gateway. All the men, except Kaylin, were carrying portable equipment. Allan swung his head to both sides as they passed through the safe area. The infrared lamp revealed several surface roots, mindlessly pressing to the edges of the low wire coils. Their tips were being oscillated into free molecules as they grew. The barrier could disintegrate even a large animal, but there was no portable equivalent for a personal weapon.

They had barely entered the heavy vegetation outside the barrier when a carnivore appeared. The wind was blowing, creating such a cacophony of small noises Allan did not at first recognize the purposeful sound of a large approaching body. When he realized they were in danger it was almost too late to fight. A long snout suddenly thrust through the vegetation only a few meters away, two eyes like giant rubies staring down at them from a head twice Allan's height off the ground.

"Hold your fire!" Allan called quickly, cutting through Gilia's startled scream. His order was unnecessary: the biologists had all noticed the flaring nostrils above the two long U-shaped rows of pointed teeth. They waited, while the dim-witted creature's eyes and nose argued over their edibility. The nose won and it turned away; the noise of its passage gradually faded into the constant small sounds around them.

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"That was a close one," Cappy Doyle said, his voice shaking slightly. "We call that large lad the elacroc, unofficially. He's big as an elephant and has teeth like a crocodile."

The Kaylins both laughed nervously, but Allan heard what seemed real fear in the C.M.'s voice. The short walk to the speaker-equipped plant, which was near the barrier but halfway around the hill, did nothing to relieve that fear. As the humans were approaching their destination they met a second hungry night prowler. This one launched itself from a tree where it had crouched in waiting, bowling over Carlson. Allan heard the sound of metallic claws ripping at the fabric of the downed man's coverall, and saw diamond-hard teeth close on the thin metal of the helmet. Then a beam from the laser ready in his hand cut into the lucent flesh of the neck, and two more from Cappy and Manabe hit it in the side. Three burns were too much even for the silicate flesh of the tree climber. It leaped away, threshing violently in its death agony, and the cacaphony of sound created by shattering vegetation almost deafened the humans. The animal was a catlike creature about twice the size of a man. When it stopped moving Allan lowered his goggles for a moment, and told Gilia to try it. He heard her gasp when she saw a slim pointed head of what seemed sparkling quartz, filled with teeth like two curved rows of pyramidal crystals.

When they arrived at the bush it took the three biologists five minutes to get over the awe, and two hours to film, record, and measure. Allan volunteered to stand guard, and Kaylin and Gilia at first watched the three men work. When they grew bored the visitors from Earth lowered their goggles, and at once were standing in a fairyland beautiful beyond words. Allan noticed the normal jungle noises slowly returning as the smaller denizens resumed their interrupted nighttime routines. He kept his infrared beam in constant motion, scanning both nearby trees and the ground, but saw nothing dangerous.

"If you could transport a section of this jungle back to Earth, it would be quite an attraction," said Kaylin, bending to examine a closed flower of fragile beauty. A huge insect with gossamer wings as large as Allan's hand fluttered to a landing on the same bush. The C.M. stared at it, utterly absorbed. Gilia uttered a low cry of appreciation.

The three men finally finished, and Carlson replaced Allan as guard. Using a field-sensitive meter Manabe had brought Allan made a few simple measurements of his own, obtaining readings on the operating current to the silver magnetic coils. The wind had been blowing intermittently since their arrival and the speaker had uttered some gibberish in the quiet period, but no dis-

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cernible words. Kaylin paid little attention to the biological speaker after an initial inspection, but Gilia seemed fascinated.

It was the work of a minute to adjust the speaker and microphone on the unit Allan and Manabe had prepared to operate on the very low plant voltage. Manabe muttered that so little power would hardly move the diaphragm, and started tying in a spare preamplifier stage on the input side.

Allan was carefully checking the wire in the silver coils; it was insulated by a layer of silicon-based tissue only a few molecules thick. The upper wires emerged from a layer of bark that formed the coils, and disappeared beneath the bark of the lower limb. Allan scraped off insulation and connected the leads from his input speaker on both sides of one coil. A breeze had started and there was no current flowing at the moment. He hesitated, and then hooked the leads from his microphone to the opposite coil in the same way. This was the procedure in which he had the least confidence. The plant should learn quickly that the diaphragm in the new speaker had an automatic return to neutral, and the primitive device of a magnetic coil on both sides was unnecessary. Whether or not it could recognize signals coming in on what to it had been half of a coordinated output was another matter.

The breeze died, and almost immediately the receiving speaker on Allan's unit muttered some low static.

There was a pause and then the sound came again, a little louder; the leaf-speaker was also rattling. Allan took a measured risk and quickly clipped the tiny wires below his attachments from the input speaker, pulling the silver coil free. The speaker sounded again, now much stronger. The noise continued for a moment while the sounds subtly changed, gained form and substance, became syllables, became words. The speaker said, "You have provided an air-vibration device."

Allan felt his heart racing and knew his hands were trembling. He heard a harsh intake of air as someone resumed breathing, but the other humans were locked in silence. He reached and cut the silver wires to the plant's second coil, laying it on the ground. Bending his face to the microphone that would feed a signal to whatever circuitry existed inside the plant, he said, "Yes, we have provided you with an air-vibration device, called a 'speaker.' This signal is generated by a similar device called a 'microphone.' "

The plant was silent, and he repeated the message. There was no doubt of the plant's intelligence, but seeing how quickly it could recognize the incoming signal and interpret the content would be a measure of its adaptability. Allan knew a moment of near exaltation when the speaker said, "I have made the necessary changes to accept your sig-

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nal. With the two air-vibration devices you have provided we may now freely communicate."

There was a low murmur from the three biologists, and Gilia laughed; she sounded on the verge of hysteria. Allan had not realized until then how great the tension had become, or that Carlson was neglecting his guard duty. There were so many questions it was difficult to know where to start. He finally settled on the most basic of all and asked, "What have you been trying to tell us with your improvised speaker."

"My extraction roots cannot cross beneath the killing barrier you have placed around the local supply of silver. The next source is far away and I must expend great energy to transport from there. Help; remove the barrier."

"Ask it why it needs the silver!" Cappy said quickly.

Allan did, and the voice replied, "I am a multiple-body entity. All forms such as the one before you are a part of my Unity. Each form in the circle of my being connects with all others through a system of underground nerves made of silver protected by my tissue. All young growing parts require silver for the communications and storage matrix that exists in every individual. I must have more silver for young growths in this area."

"Conscience! Ask it if all its individual forms are identical in structure!" Carlson demanded, unable to restrain himself.

The voice they were hearing was toneless and mechanical, without inflection or intonation other than pauses for periods. The excited scientist had spoken loudly enough for the speaker to hear. The monotonous voice said, "All my parts are not identical. Some are grown to produce electricity which is distributed to all. Others grow with trunks much larger than the one before you. The extra space in these is supplied with silver in matrix form and used for the storage of accumulated knowledge. Unity draws upon any part as necessary."

"How did you learn to speak English?" demanded Kaylin loudly. Allan had forgotten the politician was there. He looked at Gilia. Her lovely face was almost ecstatic with the joy of discovery. She felt his stare, lifted her rapt gaze to meet his, and Allan experienced a sudden and intense moment of sadness. This woman should have become a Conscience. Instead she would finish her government-paid honeymoon and become a politician's wife on Earth. It seemed a terrible waste of potential.'

"All my individual forms have leaves sensitive to slow vibrations transmitted through the air. Other leaves and roots are sensitive to temperature-electrical potential-touch-and kinesthetics. I am aware of my own structure down to the level you think of as molecular. When your vibrations appeared in the air I realized they were a new form of slow

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communication. I transformed all slow vibrations to the faster ones that could be stored in my memory and accumulated them. Analysis revealed the structure of the communication and over several years I slowly learned the meaning of individual words. When I felt ready to communicate with you I changed the growth pattern of the form before you to create an air-vibration device. It is of poor quality and I have had difficulty in producing the correct sounds. The one you have provided is much more efficient. The signaling device you have attached to my nerves enables me to receive your communication in the electrical form which is acceptable without transformation."

"Why did you operate your air-vibration device only at night?" asked Cappy Doyle.

There was a moment of silence. Allan sensed that the question posed a strain for the plant's still limited vocabulary. After a moment the speaker said. "I do not possess the quality you think of as intelligence when my forms are receiving sunlight. All my sensors and storage banks function but the Unity that is speaking to you does not exist while each individual form accumulates energy. When the sunlight ends and the energy cycle reverses Unity resumes from the previous night."

Crystal had only one small continent in the temperate zone; most of the planet's surface was hidden beneath water or ice. Unity was restricted to one plant form on the single warm land mass. So far as Allan knew this creature, like its world, was unique. It was not only the first intelligent plant, it was the first life form that covered an entire continent with what must be millions of inter-connected individuals.

Unity spoke again; "Will you remove the barrier and permit my roots to reach the silver I need?"

"Certainly!" and "Of course!" Cappy and Allan said simultaneously. They glanced at each other, and Allan gestured for Cappy to speak. The thin biologist said, "Tomorrow we will deactivate small sections of our barrier at frequent intervals around the circle. You may send roots in through all of them. If it would help you, we will bring pure silver here."

"I cannot utilize the process you call smelting," Unity replied. "My roots must absorb silver as it is found in small quantities in the natural state. Open places in the barrier will serve my needs."

"Hadn't we better be getting back?" Kaylin asked suddenly. "You people are paying no attention to guarding us, and I don't want one of those glass-toothed monsters taking a bite out of Gilia."

"Celal!" Gilia protested immediately. "I've never been so enthralled in my life!"

The C.M. was right; they were being inexcusably careless. Allan glanced at Cappy, who nodded. "We will return tomorrow night and talk

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with you again," Allan said into the microphone. "You have learned a great deal from listening to us; we wish to learn from you. In return we will provide you with better access to our knowledge, which is greater perhaps than you can store in your memory trees. For now we will say good-bye."

"Good-bye," said Unity tonelessly. The term could have no meaning for a creature whose separate parts were always connected by an electrical system, but Unity had learned something of human customs during its eavesdropping.

Allan disconnected his leads from the silver nerves, examined the delicate wires, and decided not to attempt to replace the fragile magnetic coils. After he left, Cappy could provide Unity with a permanent communications system, wired directly into the research station.

There were no attacks by carnivores on the return trip. Allan glanced at his chronometer as they entered the door and saw to his amazement that it was barely midnight on Crystal. The slow walk and the talk with Unity had seemed to last many hours. The Kaylins said good night and retired to their quarters immediately, but Allan and the three biologists gathered in the deserted community room for some shop talk. Allan's decision was a forgone conclusion Crystal could not be colonized or turned into a vacation resort but there was no harm in the research station remaining indefinitely. Cappy wanted Allan to press for a larger appropriation in his report, and he had no choice but to agree. The P.P. budget and that of the research group were determined by different Council agencies, but a recommendation by a Conscience always carried weight.

At the community breakfast Allan learned to his surprise that the Kaylins were leaving that morning. The Space Service neverlander that had brought them was waiting overhead, and the C.M. wanted to make several other stops on planets where P.P.'s were at work.

The Kaylins left to pack and Allan started preparing his report. He had two more weeks before a neverlander scheduled for Earth would stop for him, two weeks to enjoy honest gravity without the constant side-pull of rotation. He wanted to get this decision off and enjoy it.

When Kaylin and Gilia were ready Allan and Cappy carried their luggage to the shuttle, waiting in a clear area behind the station. The C.M. stood fidgeting as the shuttle pilot stored their gear, something obviously troubling him. When the pilot sealed the compartment door and it was time to board, Kaylin abruptly said, "I hope you two don't really think you've fooled me all that easily."

Allan felt a sudden coldness along his spine. Cappy looked a startled inquiry at Kaylin. "Oh, I don't really blame you for trying to preserve the

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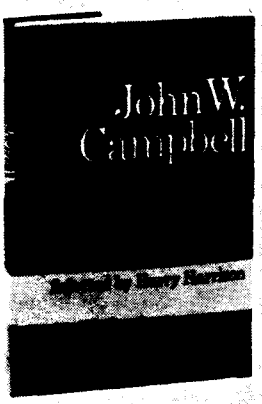

P P Corps, Allan, or Cappy for wanting his budget enlarged. Everyone does it, though not many come up with as elaborate a game as you two played last night. But, if you think I really believed all that about *an intelligent plant that covers this continent* gentlemen, I'm not that naive!"

Allan saw the expression of half-angry cynicism on Kaylin's dark face, the weary look of a man subject to constant pressures who had learned not to believe even his own eyes. The C M went on, "It couldn't have been very hard to make those coils and that bent leaf, and, of course, someone was hiding in the jungle and speaking into a mike on the other end of those silver wires. I'll admit it was very impressive, and Gilia certainly enjoyed the show, but *I'm not convinced.*"

"Celal!" said Gilia, distress in her voice. Kaylin patted her hand, and abruptly turned and started climbing the steep metal ladder to the air lock. She stared after him, perplexed, and Allan saw the struggle on her face as she tried to decide if her husband were right. The battle was quickly resolved. She impulsively stepped to

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Allan, took his hand, and said rapidly, "I'll work on him; between now and home I have four weeks in which to change his mind. He's doing you an injustice, but I hope you can forgive him. If you saw some of the schemes people pull to trick him, you'd understand"

Allan bent and kissed her cheek. "Don't worry about it. I'll be at that hearing when it convenes. I've an idea I think will convince both Celal and all the other committee members that we are really worth our money."

Gilia turned and quickly followed Kaylin. She waved at the air-lock door and disappeared inside. Allan and Cappy moved back to watch the shuttle lift off, then walked to the station in silence.

"I'll be going back to the speaker plant tonight, and I'd like to go alone," Allan said as they entered. Cappy gave him a sharp look, but said nothing.

Shortly after dark Allan was on his way through the now familiar but always dangerous jungle, laser ready in his hand. This time he reached the Crier without incident, and carefully connected the speaking device to the silver nerves.

"Are you ready to communicate?" Allan spoke into the microphone.

"I am ready. I have found the inactive areas in the vibration barrier. Some of my roots are already near the silver."

"Good; I hope the harm we have done you will be swiftly overcome," Allan said. "I have a question that is very important to me. Can you impress enough knowledge on one of your storage forms to enable it to live, speak and think as if it were a small version of Unity?"

There was a short silence, as though electrical impulses were rushing from nerve center to nerve center, through a million plants and across an entire continent. The speaker said, "I can accomplish this within six activity periods."

"Will you do this for me, and allow me to remove that individual and take it to my home planet, if I guarantee that it will be returned and reconnected into the Unity unharmed?"

This time the silence was shorter. The speaker said, "I will."

Allen lowered his goggles and looked at the dazzling beauty of crystal for the first time that night. All the desk-bound committee members should have come with their chairman. But perhaps they would be like Kaylin, unable to believe their eyes and ears.

Unity had said it understood the structure of its forms down to the molecular level. Introducing a plant as a hearing witness, and having it submit obviously valuable new knowledge as a justification for the work of the P.P. Corps, was a means of bringing something of Crystal to the committee.

Allan chuckled; it was going to be another unique experience. ■

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Mr. Winthrop Projects

The compulsive power of a gun is obvious—but there's also the not-always-gentle art of persuasion!

BY TAK HALLUS

ILLUSTRATED BY JERRY SUMMERS

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Sunlight burst through the cabin window as Browning threw apart the curtains.

"There you go, Swami," said Browning, turning from the open window but still obscured by his dark contrast to the bright day behind him. "Is that enough nature for you?"

Mr. Winthrop, seated on the wooden floor in a full lotus position, squinted at the sudden light. Somewhere out in the forest that surrounded the cabin, a bird chirped. A pine-scented wafture of moist mountain air reached him and he took several *Pranayama*, pulling the air deeply into his lungs.

"That's fine, Browning," he answered.

Browning nodded once, his great round head like a basketball with ears when silhouetted in the sunlight, and moved away from the window, returning to the solitaire game he had left on the table.

"But I'm not a swami."

Browning sat down and looked over the plat of cards, reminding himself of their positions. He picked up the deck and turned up the first card, then paused and twisted around in his chair as if Mr. Winthrop's protest had only just arrived at his brain after the long journey from his ear.

"A guru?"

"I'm not a guru either."

"A yoga?"

"Yogi. Yes, in an eclectic sort of way."

"What do you call yourself, Winthrop?"

"An ad-man."

Browning turned back to his game, flipping up a card, then placing it on the table with a plastic snap of its corner.

"I like Swami better," he said without looking around.

"I don't suppose it matters," said Mr. Winthrop.

"Nope. As long as you do your job, it don't matter what you call yourself."

Mr. Winthrop was still unsure precisely what job he was supposed to do. The only certainty was the consequence of failure. He had worked for the past week setting up the Winthrop Projector in the basement of the cabin, an unlikely enough place for a telethesia projector, and on the one occasion when fatigue had overtaken him, Browning had interpreted his clumsiness with the equipment as an attempted slowdown and pulled an ugly looking .45 from inside his coat, jamming a bullet-laden clip into the grip and jacking a shell into the chamber. Browning said nothing at the time, but Mr. Winthrop got the message.

"You gonna have that thing ready to show Mr. Nicolson today?" asked Browning without looking up from his game.

Shaken from his thoughts by the mention of Nicolson's name, a name that gathered significance the longer its owner remained absent from the cabin, Mr. Winthrop took his feet

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out of his lap and stood up.

"Yes. I think so."

"You better."

"All I can do is my best."

Browning turned from his game, smiling a toothy grin meant more to unsettle than reassure.

"That's right, Swami. Mr. Nicolson wants you to do your best." The smile faded slowly as Browning's eyes moved from Mr. Winthrop to the rug that covered the trapdoor to the basement, indicating the conversation was finished and it was time to get moving.

"All right. All right," said Mr. Winthrop, walking to the rug and skidding it aside with a bare foot. "But I could work a lot better if I knew more about the goal."

"You'll learn all that soon enough," said Browning, gesturing at Mr. Winthrop with a little downward hooking motion of the ace of spades between his fingers, urging Mr. Winthrop to get down to work.

Mr. Winthrop stooped and touched the two loose boards—positioned so it was impossible to step on both at the same time—that activated the door. It slid back, sighing with a faint hydraulic *whish* and revealing the top two metal steps of a staircase descending to darkness. He stood up and patted the pockets of the baggy coveralls Browning had given him to replace his gray pin-striped suit.

"Did I leave my screwdriver up here?"

"Huh?" asked Browning, glancing at the card in his hand as if it might somehow have transformed itself into a screwdriver.

"Screwdriver," repeated Mr. Winthrop.

"Oh," said Browning, lingering on the sound. "Screwdriver."

"Yes."

"Ain't seen it."

"You know, Browning, if you keep me working in that damp cellar in my bare feet, I'm liable to electrocute myself. Then where would you be?"

"I wouldn't do that if I was you, Swami." Browning frowned slightly. "Mr. Nicolson wouldn't like it."

"So why don't you give me my shoes?"

Browning waved the card in his hand toward the open window. "It's hard to run over pine cones barefoot. Besides, if you think you're going to get zapped, you'll be careful." Browning paused a moment, then grinned as if a better way of putting it had occurred to him. "It'll keep you on your toes, Swami." The grin faded. "Now get to work."

Mr. Winthrop turned toward the hole in the floor and started down the steps, feeling them shake under even his slight weight and hearing flanges rattling against bolts somewhere below him. At the bottom of the stairs, he touched the light switch. Four overhead lights in enameled metal shades flooded light over the concrete floor and walls of the dingy basement.

Attached to the wall opposite Mr.

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Winthrop was a workbench. His equipment, the Winthrop Projector in its four-foot cabinet topped by an inch diameter parabolic reflector, sat next to a hologram recorder, a lifeless oscilloscope, a voltmeter and a new set of hand tools that Browning had brought him.

He walked to the workbench and cleared away the bits of wire and solder left from the previous day's work, sweeping them onto the floor with the edge of his hand, then examined the projector to see where he had left off.

Mr. Winthrop had originally envisioned something like the projector as a graduate student forty years before. Though he had been working on his Ph.D. in electronics at the time, trying to get the data for his dissertation—*"On the Properties and Potentialities of Super High Frequency Semiconductors,"* University of California Press, 1953—into some kind of shape, he still had connections in the psychology department where he got his first doctorate. In particular he still met frequently with Dr. Kempton, chairman of his board in the psych department and a man whose test procedures were still used in parapsychological researches. It was at this time that Mr. Winthrop volunteered to act as one member of a control group that would establish a statistically "normal" standard against which to measure Dr. Kempton's "specimens." Mr. Winthrop proved abnormal.

He was immediately shifted to the "specimen" group. It turned out Mr. Winthrop had what Dr. Kempton could only classify as "uncanny negative intuition." Sitting in Dr. Kempton's laboratory, waiting for a flashing light to indicate that the person in the next room had turned over another ESP card and was concentrating on it, Mr. Winthrop would mark one of the five symbols on his answer sheet and invariably be wrong.

This performance never bothered Mr. Winthrop, who was thinking about semiconductors most of the time in those days, but it bothered Dr. Kempton who re-tested Mr. Winthrop in every permutation of the basic situation, invariably finding that Mr. Winthrop was wrong.

"It's impossible, Winthrop," said Dr. Kempton on the day after scoring one of Mr. Winthrop's tests.

"What's impossible."

"That you should score well over four standard deviations below the statistical mean."

"Do you think I cheated?" asked Mr. Winthrop, his tone indignant at having put out his best efforts only to be accused of some impropriety.

"Not at all." Dr. Kempton glanced down at the score sheet and tugged thoughtfully at one corner of his drooping black moustache. "I just wonder how you got through school with this . . . this problem of yours."

"I never thought of it as a problem."

"But half of taking examinations is guessing."

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"I don't think it has anything to do with guessing," said Mr. Winthrop. "I always did all right on guessing."

"You did?"

"Check my transcripts."

Dr. Kempton looked past Mr. Winthrop, as if reading some thought in the air just behind him. "Come with me, Winthrop. I want to run a few more tests on you."

Dr. Kempton's tests, by putting Mr. Winthrop on the card-flipping end of the testing, proved fruitful. There were times, usually when Mr. Winthrop was relaxed after a good night's sleep, that the subject in the other room named one hundred percent of the cards Mr. Winthrop turned up. There were other times, when he was distracted by his upcoming orals for the electronics doctorate, that the score conformed to the statistical mean.

The tests and his electronics degree were finished about the same time. Mr. Winthrop had been away from the psychology department for several weeks, occupying himself with the problem of getting a job, before he got Dr. Kempton's final judgment on the test series.

"Do you remember that mood series we did?" asked Dr. Kempton, indicating a pile of papers on his office desk.

"Yes."

"On your good days, the subjects even picked up your mood. For example, on May 5th, you were depressed about something."

"Orals. . . . just the Orals."

"Whatever. In any case, every one of the subjects reported depression, some more than others. And on May 15th you were elated about something."

"Orals."

Dr. Kempton looked up, a raised eyebrow asking how the same stimulus could cause two such diverse responses.

"They were over."

"Oh."

Mr. Winthrop grinned.

"Anyway, each of the subjects came out of the test rooms elated.

"Maybe they were glad to get out."

Dr. Kempton grunted. "The nearest I can guess is that you have some sort of ability that occasionally allows you to project your thoughts, and more consistently allows you to project your mood, though both seem so random they must be uncontrollable. That's what blocked out any reception when you were on the receiving end of the tests."

"Maybe I should have been an actor."

"That reminds me, Winthrop. What are you going to do now that your education's finished? I could arrange something in this department, if that would interest you."

"Ad-man."

"Pardon me."

"I'm going into advertising."

"After ten years of higher education!" Dr. Kempton's expression was shocked to the point of anger.

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"You are going into advertising!"

"Because of it."

The years passed and Mr. Winthrop prospered. Aided by his background in psychology and a sharp sense of intuition, he managed to rise quickly in a cutthroat industry and stay on top. Flexibility and imagination were his operating principles. When visiphones came into general use in the mid-Eighties, he contracted with AT&T to establish "Operation Busy Body," the campaign that sandwiched three-second deodorant commercials between busy signals.

"If you're as busy as they are," a healthy looking Swedish blonde would say, "try No-ōd." Then she would turn discreetly away from the camera, revealing an interesting expanse of bare back, as if preparing to try No-ōd. It was discovered that a high percentage of middle-aged men would punch out their own numbers just to watch the busy signals.

His electronics degree contributed little to this success until the early Nineties, though he kept up with the field and even made a few small contributions through experiments with organic circuitry in his home laboratory. Then in the spring of 1990 he read Dill's paper on generating the Alpha rhythm through inductive fields and knew that technology had at last caught up with his vision. If you could put people to sleep electronically, he reasoned, without attaching electrodes and without the subject being aware of the process, you could do other things. You could advertise inside his cranium, for example. An ideal method of getting a client's message across. But there were problems. Electronically reproduced and induced Alpha rhythms were one thing, modulating the signal with an intelligible comment about a product was another. That was Mr. Winthrop's contribution

Mr. Winthrop heard a metallic rattling from the stairs behind him and looked up from the tip of his soldering gun. He could only work on the grosser aspects of the circuitry in this environment, the power supply and some of the intermediate phase amplifiers, but Browning didn't seem to have damaged any of the equipment in transit, so nothing more was necessary. Browning was coming down the stairs, his hand in his coat pocket and by the shape of the bulge around it, holding a large lump of metal.

"Drop the gun, Winthrop!" shouted Browning across the basement, pausing with one foot still on the bottom step and a hand on the railing.

Mr. Winthrop looked at the soldering gun in his hand.

"This?" he said, holding it up and clicking the trigger several times. Two lights under the soldering tip blinked as he clicked.

"Drop it!"

He dropped it, hearing it clatter against the concrete floor and glanc-

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ing down at it. The tarnished copper tip was bent at a disjointed, perpendicular angle to the body of the gun.

Browning looked back up the stairs, cupping his free hand around his mouth, and shouted.

"All right, Mr. Nicolson! It's safe!"

Nicolson. *The* Nicolson, thought Mr. Winthrop, watching the stairs as first a black leather shoe and gray pantleg, then another shoe and pantleg, appeared. When the body was visible to the waist, the man bent down and a head appeared just below the door in the ceiling.

Jesus! Nicolson! thought Mr. Winthrop when he recognized the face and felt irritated with himself for failing to make the connection before.

Satisfied that it was safe, the face disappeared and the body continued down the stairs until the whole man was visible.

"There it is, Mr. Nicolson," said Browning, gesturing in Mr. Winthrop's general direction with a contracted jerk of the hand in his coat pocket.

"Does it work?"

"Don't ask me. Ask him." Browning nodded toward Mr. Winthrop.

Nicolson dismounted the stairs and walked the jaunty walk of a short man across the basement floor toward Mr. Winthrop. Nicolson had a head and neck like a golf ball on a tee: a small round head on a thin neck, and cocked it to one side, inspecting Mr. Winthrop and the equipment as he approached.

"So this is it, eh, Winthrop?" said Nicolson. He said it as though Mr. Winthrop were a long-time employee who had only just finished a project they had worked on together for years. Though Mr. Winthrop recognized Nicolson from television news clips, he had never met him.

"Yes, that's it, Senator. Now when do I get out of here?"

"Be patient, Winthrop." Nicolson inspected the equipment, standing with his hands clasped behind him as if the projector were some *objet d'art* he was considering purchasing but reluctant to touch.

"Patient! I was in the middle of one of the biggest ad-campaigns my agency has ever mounted when that thug of yours—"

"Nephew."

"Pardon me?"

"He's my nephew. The boy was always a problem until I found work for him."

"Oh," said Mr. Winthrop, blinking once at Browning, then returning his gaze to Nicolson. "There is a family resemblance."

"Shape of the head."

"Round, yes. I see it."

"Oval."

"Look, Nicolson!" said Mr. Winthrop, increasing his fervor, "I don't care if it's square! I want out of here!"

"When your work's done, we'll see about it."

Suddenly Mr. Winthrop had a

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cold premonition, a vision of his probable future. He looked at the bulge in Browning's pocket.

"How . . ." said Mr. Winthrop and swallowed. "How do I know I'll get out?"

"You don't."

"But—"

"Murder hasn't been my line."

"Has kidnapping?"

"Not until now," said Nicolson and looked up from the projector, grinning at Mr. Winthrop with a grin that echoed Browning's tight malicious grin.

"I see how you got as far as you did in politics."

"I'm not done yet, Winthrop." Nicolson's grin retreated to a self-satisfied smile and he returned his attention to the projector. At last the goal was clear to Mr. Winthrop. Why the possibility had never occurred to him, a man with forty years experience in the advertising game, he didn't know, but watching Nicolson inspect his equipment, there could be no mistaking it. The same techniques that marketed underarm deodorant, marketed politicians, and Nicolson was up for re-election in '96. Or was he after a different market?

"The presidency?" said Mr. Winthrop tentatively.

"You've got it, Winthrop. Now show me how this stuff works."

Mr. Winthrop's thoughts spun with the ramifications of Nicolson's plan. He imagined Winthrop Projectors in vans outside every polling place in America, tapes inside spinning out the message, selling the product, selling America on Nicolson. He imagined the repeal of the Twenty-second Amendment and Nicolson President for life, and beyond, through some appointed successor. Browning? No, Nicolson had more sense than that. He imagined Nicolson as President, signing the order imprisoning Mr. Winthrop for life.

"Nicolson, how do you suppose the electorate will react when they hear about this kidnapping business?"

"Who'll believe you?"

"My reputation for honesty is—"

"Who'll believe you," interrupted Nicolson, indicating the projector with a flick of his index finger, "when I have the ideal means of convincing them otherwise? Now how does this thing work, Winthrop? I have to get back to Washington. And make it simple. I'm no electronics expert."

"Neither's Browning," said Mr. Winthrop, prodding the soldering gun with the tip of his big toe.

Mr. Winthrop explained that the projector used a slight Alpha rhythm as a carrier, raising the subject's consciousness threshold to a point just short of somnolence, then phase modulated it, generating controlled fantasies in the subject's preconscious mind.

"Dreams," said Nicolson.

"Yes, but controlled dreams."

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"But you mean unconscious."

It irritated Mr. Winthrop to have his authority questioned on so elemental a point. "When I say preconscious, I mean preconscious. If it was generated in the unconscious, we would get extremely unreliable results. The best analogy I can give you is post-hypnotic suggestion. The hypnotist tells the subject he will have an overwhelming desire for oranges ten minutes after he emerges from hypnosis and will search everywhere for them. That's just words. Ten minutes after he emerges, he has an overwhelming desire for oranges and searches everywhere for them. That's conduct."

Nicolson, a man who frequently listened to experts descant before forming his professional judgments, nodded understandingly, though it was difficult to tell how much he understood.

"I see."

"Fantasies work in much the same way. For example, you may awaken from a dream in which you were continually frustrated in attaining some goal, love, safety, crucial information, advancement."

Anything. In one way this is a method of telling you something is not right in your life and you must do something about it. In another, it is a method of releasing the tensions of life through fantasies."

"Dreams," said Nicolson. "This thing makes dreams." Nicolson's round cheeks became flushed and his eyes narrowed, angry now that he realized what the projector did. "What good are dreams?"

"Controlled dreams."

"So what?"

"If you're selling dream oranges, it does a lot of good."

"Orang—" Nicolson's eyes came open, wide and sparkling. He nodded vigorously, emitting a sustained "*Ahhh*" to show his pleasure and comprehension. "Oranges. *Ahh*, yes," said Nicolson. "Is it set up for anything?"

"No-Snap Wrap."

Nicolson looked at Mr. Winthrop, a faint puzzlement on his face. "Never heard of it."

"It's new. Not bad stuff, actually."

"What is it?"

"Do you really want to know?"

"Yes," said Nicolson. The way he said it, combined with his deepening frown, suggested he might have to use stronger means if he weren't told.

"It's an oxygen catalyzed banding product, like a rubber band, that lets you wrap a bundle and wait ten minutes while it shrinks tight."

"Snapless?"

"Yes."

"Doesn't sound very exciting."

"That's my job. To make it sound exciting. Besides, I can't control what kind of products people try to market."

A faint smile appeared on Nicolson's thin lips. "Then you shouldn't mind working for me. Now let's see how this thing works."

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"Oh, no!" yelped Browning, quickly dodging under the staircase. "You ain't using that Swami's gizmo on me!"

"Browning!" said Nicolson, harsh authority and decisive leadership back in his voice now that he was dealing with something within his purview. "You get out here or I'll tell my sister she can put you back to work in the plumbing shop!"

Nicolson turned to Mr. Winthrop. "It won't hurt him, will it?"

"Unfortunately, no."

"All right, Browning! Get out here!"

Browning peered out from under the staircase, his .45 in his hand with the hammer back.

"And put that away!"

"O.K., Mr. Nicolson. But if he zaps me in the head and jumps you, don't blame me."

Nicolson looked at Mr. Winthrop. "He has a point there." Then turned back to Browning. "Give me the gun."

Browning walked over and handed Nicolson the automatic, checking it first to make sure the safety was on.

"Where did you get this old thing, Browning?" asked Nicolson, scrutinizing the .45.

"Old Reliable," said Browning. "I've had it since I was a kid."

"We'll have to get you something better."

"No thanks. That one works every time," said Browning and grinned at Mr. Winthrop.

Nicolson slipped the gun into his pocket. "Go ahead, Winthrop."

Mr. Winthrop flipped up a half-dozen safety covers over switches and pressed each switch in turn. There was no sound, nor any visible reaction by the projector, except for the pointers on two meters that jumped halfway across their scales and a sine wave that appeared on the oscilloscope, an S on its side under the grid on the screen.

"Ready," said Mr. Winthrop.

Nicolson nodded.

Mr. Winthrop touched the hologram recorder and thick tape started moving past the laser playback head, collecting on the empty spool while it fed the basic commercial content into the projector.

Watching the recorder, Mr. Winthrop realized he had neglected to explain one element of the system to Nicolson; how the tape was prepared. He had failed to mention that the Alpha rhythm was modulated by a combination of the three-dimensional image, in this case the No-Snap Wrap, and Mr. Winthrop's own mood projections, picked up as a spurious effect by the hologram recorder in something like the same manner that students in Dr. Kempton's lab had picked up his mood.

Making the initial tape had proved the most difficult and delicate part of the operation. Mr. Winthrop had taken up yoga at the age of sixty in order to calm his nerves and develop the degree of emotional control necessary to "orchestrate" the

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tape. After much experimentation, Mr. Winthrop had found that his best method of stimulating the acquisitive desire necessary to supplement the tape was to focus his mood at first on the impulse to purchase—a task he found relatively simple after his years of studying that phenomenon in the advertising business—then work his emotions through a sequence of Desire, Purchase and Fulfillment all while the laser-punctured tape was recording the product. The recording, for reasons Mr. Winthrop was only beginning to understand, picked up the emotional sequence as a sort of Empathy track surrounding the product and when the tape was played through the telethes- projector, the result was analogous to a posthypnotic suggestion to purchase the product.

"I like some," said Browning.

After the demonstration, Nicolson ordered Mr. Winthrop to prepare a tape with him as the subject matter rather than its present product.

"No-Snap Nicolson," said Browning and grinned at his own sudden wit.

Nicolson scowled and Browning attempted an expression with more gravity, forcing the corners of his mouth down while the center involuntarily continued to smile. The result was a pouch-lipped camel expression that seemed to irritate Nicolson more than the grin.

Nicolson turned back to Mr. Winthrop, mild disgust dimpling one corner of his mouth.

"Will this do for an image, Winthrop?" asked Nicolson and pulled a depthphoto of himself from his inside coat pocket. "I have to get back to Washington. It's the original from one of my campaign posters."

"I suppose so," answered Mr. Winthrop, considering the full, youthful contours of the depthphoto. "But it's not a very good likeness."

"It is, too," insisted Nicolson, peering at the picture.

"Look at the shape of the head," said Mr. Winthrop, running his finger around the face in the depthphoto.

"Looks perfectly normal to me."

"That's what I mean."

Nicolson's eyes flicked up from the depthphoto, fixing Mr. Winthrop with a squinting stare and pressing his lips tightly together until he spoke.

"Listen, Winthrop"—Nicolson reached into his pocket and extracted Browning's .45, waving the tip of its keyhole shaped muzzle under the tip of Mr. Winthrop's brown nose—"just because I need you right now, doesn't give you the right to wisecrack about me!" Nicolson's eyes went from Mr. Winthrop's to the .45, recognition dawning in them, as if unaware until now what was in his hand. He returned the gun to his pocket.

"Who's wisecracking?"

"*You* were!"

"Not me."

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Nicolson looked at Browning. "Was he wisecracking?"

"Huh?" said Browning, who had been thinking about something else, or at least not thinking about the conversation.

"Was Winthrop wisecracking?"

"Let me see the picture and I'll tell you."

Nicolson handed the depthphoto to Browning.

"Well?"

"Nope," said Browning, staring at the picture and mustering a solemn, judicial expression. "He wasn't wisecracking. It's a terrible picture of you. It's very dignified, though."

Nicolson grunted and snapped the picture out of Browning's fingers.

"Use it anyway," he said, thrusting the depthphoto toward Mr. Winthrop. "I've got to get back to Washington."

Nicolson started for the staircase, handing Browning the .45 as he passed, but paused before mounting them, looking back across the basement toward Mr. Winthrop. "And do a good job, Winthrop. There might be a bonus in it for you if you do a good job . . ."

"That's better than I'm getting now," said Mr. Winthrop quietly.

". . . I want to be sold like I've never been sold before!" concluded Nicolson, disappearing up the stairs and waving at Browning and Mr. Winthrop as if leaving a press conference. There was a faint *whish* as the door closed above them.

"Old No-Snap's a little touchy about his dignity, ain't he, Swami?"

"Uh-m-m," answered Mr. Winthrop in the noncommittal way he had developed after years of heading the Winthrop agency.

Mr. Winthrop turned back to the workbench and Browning eased up behind him, peering over his shoulder at the depthphoto.

"What are you doing now, Swami?"

"Looking at the picture."

"Oh," said Browning. "I'll leave you alone then, so you can do it right. Old No-Snap wants you to do it right."

Mr. Winthrop continued examining the depthphoto, noticing how the photographer had removed some of Nicolson's more obvious imperfections, until he heard the staircase rattle and the overhead door *whish*, indicating that Browning was in the cabin above. While rewinding the hologram tape, Mr. Winthrop planned his attack on the problem. Selling Nicolson. Selling Nicolson. The idea floated in his brain like an abandoned ship in the fog. Nicolson wanted to be sold. He wanted to be sold like he had never been sold before. He wanted-- And suddenly Mr. Winthrop had it. The perfect marketing strategy.

The week went by with Mr. Winthrop persevering on the tape. Every morning he would wake at 7:00 a.m. in the cabin to find Browning staring at him. Browning slept during the day when Mr. Winthrop

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was safe in the basement. From 7:00 a.m. to 8:00 a.m. Mr. Winthrop would go through a series of *Hatha* yoga exercises, beginning supine in the *Salvasana* and working his way through a *Bhujangasana*, or on alternate days a *Salabhasana* instead, to a perfect *Sirsasana* headstand, at last ending it with a *Padmasana*, the classic full lotus position with his hands on his knees, index fingers and thumbs forming the proper "O" position of the *mudra*.

By 8:00 o'clock his sensory thresholds were so low that not only the sputter and putt of the unfertilized eggs Browning cooked for Mr. Winthrop's breakfast—Mr. Winthrop had become a vegetarian shortly after becoming a yogi—but every other sense impression became sharply focused in his mind and with them the sensitivity he needed to gauge the emotional effect of his orchestrated telethesia tape. Though it was only necessary to get Nicolson's picture on the tape once, copying the aura of visionary leadership and dignified practicality caught by the depth-photo, it took great sensitivity and considerable reworking to get the exact effect he wanted from the Empathy track.

At one point Mr. Winthrop even considered the possibility that Nicolson might make a good presidential candidate. After all, Nicolson's voting record in the Senate, as far as Mr. Winthrop was concerned, was adequate, if undistinguished. Nicolson had a tendency to vote for what was popular and harmless, rather than stand on principle and be defeated in the next election, but that was only good politics. As someone had said, half of being a politician was getting elected and the other half was getting reelected. If Nicolson turned out to be as responsive to his constituency as President, was there anything wrong with it? Mr. Winthrop quickly abandoned such thoughts, realizing that Nicolson would need to be responsive only to his own whims with the projector to insure election. Besides, Nicolson was alien to the American tradition since there had never been a kidnapper-president.

"Is it finished yet, Winthrop?" shouted Nicolson from the stairs a week later.

"Almost."

The stairs rattled and clanked as Nicolson made his way down, followed by Browning, who rubbed sleep from his eyes with both fists and yawned between them.

"Good." Nicolson walked across the basement, striding confidently with his coat pushed back and his hands in his pockets. "You can't imagine what a week I've had."

"Mine's been pretty quiet."

"I imagine so, Winthrop." Nicolson glanced over his shoulder at Browning. "Has he been working every day?"

"If that's work," answered Browning. "Every morning he gets up and twists himself into a pretzel for an

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hour, then comes down here."

"We all have our strange habits, Browning," said Nicolson, smiling at Mr. Winthrop. "You'll have to learn to be tolerant if you want to get ahead in this world."

"You're in a good mood today," said Mr. Winthrop.

"And why shouldn't I be?" Nicolson held his index finger and thumb an inch apart in front of Mr. Winthrop's face. "I'm *that* far from the presidency if this thing of yours works." He dropped his hand.

"It works."

"It better."

"Yeah," said Browning, grinning.

Mr. Winthrop had skipped his yoga today, having completed the Empathy track for the recording the previous day. He knew it accounted for some of his nervousness. Nicolson's presence for a demonstration accounted for the rest.

"Let's see it, Winthrop."

Mr. Winthrop gestured to Browning to stand in front of the projector.

"Oh, no!"

"It didn't hurt last time, did it?" asked Nicolson.

"No, but this is different."

"Don't you want to vote for your uncle?" asked Mr. Winthrop.

"Sure," said Browning, glancing back and forth between Mr. Winthrop and Nicolson. "Family's family, but you ain't tried this one on anybody."

"Get out of the way, Browning," said Nicolson, shoving Browning out of the area of the projector's field. "I wanted to see how this thing worked anyway. What's on this tape, Winthrop?"

"Just you."

"Fine. Fine."

Mr. Winthrop's nervousness increased and he punched the playback button on the recorder. He was thankful he had to do nothing more to get Nicolson into the field. Tape started past the head.

"Nothing's happening," said Nicolson.

Mr. Winthrop glanced at the tape.

"It will."

Suddenly Nicolson's face was suffused with pleasure, his black eyebrows hopping up his forehead to form neat semicircles above his wide-open eyes. Slowly his jaw became slack and his mouth opened slightly, growing into an awestruck smile as Mr. Winthrop watched.

"Is it working, Mr. Nicolson?" asked Browning.

"It's beau-ti-ful, Brown-ing." Nicolson's voice was slow and enraptured, without its normally crisp pronunciation.

"What do we do now?" asked Browning.

"Let him go."

"I'll need my shoes," interjected Mr. Winthrop.

"Let him go?" Browning cocked his head to one side and squinted into Nicolson's almost gleeful eyes. "Are you sure about that, Mr. Nicolson?"

"It works. It's beautiful. Let him go."

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"All right, Mr. Nicolson. But that wasn't the way we planned it."

Mr Winthrop shivered.

"My shoes."

"They're upstairs in the cabinet. Mr. Nicolson, you want me to drive him to the airport, too?"

"Let him go," repeated Nicolson.

Browning shrugged, turning his palms toward the ceiling and looking toward Mr. Winthrop for sympathy. "He says let you go—I let you go, Swami."

Mr Winthrop glanced at the tape, noting it still had ten minutes to play, and headed across the basement floor. He padded up the metal stairs and through the open door into the cabin. He found the storage cabinet with his shoes and clothes, slipped his shoes on quickly and scooped up his gray suit, planning to change later.

Outside the cabin, Mr. Winthrop picked a direction through the forest that would bring him out near the mountain town they had passed on the way in, yet keep him away from the road. He started into the forest at a brisk trot, hugging his suit under his left arm and, for the first time that morning, felt the knot in his stomach relax. The air was cool and somewhere ahead birds began to sense his presence. They fluttered, chirped and flew from limbs as he trotted past. He glanced at his watch as he ran. The ten minutes were about up. It would be another minute or two until the time delay circuit he had installed during the week went off and fused the projector into a lump of modern art. When Nicolson realized what had happened, he would send Browning in pursuit, but Mr. Winthrop had enough of a lead.

Mr. Winthrop smiled, remembering Nicolson's expression. Nicolson's own image, a dignified and overwhelming symbol of achievement and competence, had captured Nicolson so completely that he was unaware of the *non sequitur* accompanying it: let Winthrop go. Such was the illogic of dreams, thought Mr. Winthrop. He had been selling dreams for forty years.

Nor had Nicolson noticed the second suggestion, slipping into his mind like an investigator from the Senate Ethics Committee, that would impel him to reveal the events in the cabin at his next press conference. A sense of freedom and accomplishment Mr. Winthrop had not felt in years swept over him.

He trotted on through the forest, beginning to make out the first of the buildings in the village. Somewhere in the distance he heard a turbine whining up a mountain road. Nicolson wanted to be sold like he had never been sold. It hadn't been too difficult after all. You can always sell a man something he wants, even if it's only a brief glimpse of who he thinks he is, thought Mr. Winthrop and trotted into the village. ■

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LEO SUMMERS

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ted thomas

motion day at the courthouse

Which has to do with the problems
faced by The Mob when a law-abiding telepath
starts throwing emery in their gears . . .

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Ellis Centerton said over the phone, "Look, Mr. Louisa, as a lawyer, I can refuse to take any case I want. The fact that you happen to head up the Mafia in this region has nothing to do with my hesitating to take your case. I happen to be one of those lawyers who believes that every man—no matter how guilty of a crime—deserves his day in court with good representation. All I said to you was I wanted to look into it further before I decided to take the case or not. I want to talk to that man of yours—Benny Luger—before I make up my mind. Now, you either go out and get yourself other counsel, or I'll meet you at the jail in fifteen minutes. You name it."

Walter Louisa was a man whose occupation often demanded quick decisions, and he made one now. "I'll meet you in the jail in fifteen minutes."

Centerton hung up and told his secretary to play back the recording of the conversation he had just had to the other partners in the law firm. Then he caught a cab. He walked in the door of the jail ten minutes later and was already sitting in the temporary detention cell looking at Benny Luger when Louisa arrived.

Louisa was a short, square man, and so he looked with some suspicion up and down the length of Centerton's six-foot-three-inch frame. The two looked at each other like two bulldogs about to dive in for the kill, then Centerton grinned and said, "Relax, Mr. Louisa, I'm only a lawyer trying to see if this is a case that really needs my great and far-reaching talents."

Louisa grunted, and hesitated, but then responded to the infectious grin. He thrust out his hand and said, "I hope it does." Mr. Louisa had made another fast decision.

They both turned to Benny Luger. Louisa said, "O.K., Benny. Tell us what happened."

"I'll tell ya," said Benny, obviously agitated. "I'll tell ya. I'm walking up Broadway, blending in pretty well with the crowd there." Centerton silently agreed that Benny would blend in; Benny wore tight clothes, bright shoes, shaggy hair and a swagger. He would never be noticed on Broadway.

Benny said, "I turned off toward Eighth Avenue and stopped at Old Joe's newsstand and put down the case I was carrying. I bought a paper and turned away, forgetting the case just like I was supposed to. I took about ten steps, patted my pockets and took out some old Hershey bar wrappers with the rocks in them and dropped them into the trash can. Neat and tidy, that was the way I was supposed to do it, then I went toward Eighth Avenue. Right?" Louisa nodded, and Benny continued. "Nothing happened when Johnny Are stepped over and picked up the case and started toward Seventh Avenue. Nothing happened when that bum began poking through the trash can. But when the bum picked out the Hershey bar wrappers, put them in

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his pocket, and started uptown along Broadway, things busted out. Two guys stepped out of line and slapped handcuffs on me before I could open my mouth. Two more did the same to the bum. Nobody bothered Johnny Are as he headed for Seventh Avenue. Get the picture?"

Centerton and Louisa nodded.

"Well," said Benny Luger, "the cops knew all about it, like they'd planned the pickup themselves. They didn't even look at Johnny with the sweet-case full of sandwiches. Didn't touch him, didn't look at him. Me, they put the arm on, the bum, they put the arm on. How did they know the rocks were in them Hershey bar wrappers?"

Centerton and Louisa looked at each other.

Benny Luger leaned close and said, "Look, I tell ya, there's a leak. Even if I didn't know a bum was gonna pick up the rocks, but the cops did, there's a leak, and you gotta do something about it. Those cops knew more than I did about the pickup, and that ain't no good, no good at all."

Centerton said to Louisa, "This is the case you brought me down here on."

Louisa shook his head and said to Benny, "We'll make bail and talk to you later. I want to talk to Mr. Centerton alone. See you later, Benny."

Out in the hall Louisa said, "Here's the rest of it. I filled in Benny Luger myself on this pickup not three hours ago, and I've had him watched in the meantime by someone who didn't know what was happening. Johnny Are knew nothing, did nothing but pick up the case, and he's home free. Willie fished the Hershey bar wrappers out without knowing what was in them. So what've we got? So Benny Luger knew and didn't tell, I knew and didn't tell, nobody else knew. That's the way I set up this test."

Centerton said, "You knew Benny would get caught?"

"I wasn't sure. Anyway, that's the way I set it up, and the cops fell for it. Now I know the cops get information, just like I thought. So I got a problem to solve, a big one. I know there's no normal leak, but somehow the cops have been on to us for several months now, like they were sitting here with us when we planned things. How are they doing it?" Then Louisa's shrewdness showed. He said, "Are they doing it legally, or illegally, Mr. Centerton?" He waited a moment then continued, "We have thoroughly explored electronic surveillance, bugs, distant pickups, taps. We've used the finest electronics man in the business, and at substantial cost, and he found nothing. Coincidence is out; I'm willing to give the police the benefit of a little luck, but the events of the past month have been too much. The cops *know*." Then he said again, "Are they doing it legally, or illegally, Mr. Centerton?"

"All right," said Centerton, "I have to agree it is very interesting.

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Come on back go the office."

In the conference room of the firm of Centerton, Westgate & Hogan, Centerton introduced Louisa to the other two senior partners. Westgate and Hogan looked at Louisa with distaste, and Centerton said to them, "I think we ought to represent Mr. Louisa and his man Benny Luger to explore police activities and to see that Benny gets a fair trial. The problem, as I've explained it to you, is interesting. Any comments?"

Hogan leaned back and said, "O.K., Ellis. It seems to me that first thing we need is the best electronics theorist we can get to check out on how the police are doing it. I assume money is no object here." He looked at Louisa, who shook his head. Hogan continued, "We've got to know if there have been any recent advances in technology that might allow the police to dig up the information they seem to be getting onto Mr. Louisa's, ah, operations. I suggest Dr. Roger Whiteman, over at Brooklyn Polytech, for a quick reading."

Louisa said, "Get him."

Two weeks later Dr. Roger Whiteman said to the group, "Technologically, I'm stumped. I've made a literature survey covering everything that might have been used for eavesdropping. Smith out at RAND has just come up with a device he calls a descriminating monitor capable of picking out a conversation between two people on Times Square on New Year's Eve from a distance of a hundred yards. Something like that *could* have been used, but Smith hasn't sold any—hasn't even told anyone about it yet—still testing to get out some bugs. So there's no scientific, or technological, way the police could have heard what was said to Benny or to anyone else."

"All right," said Centerton. "I've been plugging ahead on the procedural route, and I'm beginning to get some information, but I don't know yet what to make of it. I made a motion to dismiss Benny Luger's indictment. I took the position with the court that the police *must* have planted a tiny pickup and broadcast unit on Benny; I explained that the whole affair involving Benny had been arranged as a test to see what the police had. The arresting officers denied planting anything, but the court made it clear that it would throw out the whole case if it were based on illegally obtained information. So the officer finally had to tell me where he got his information." He stopped for effect, like any good trial lawyer.

"Go on," said Hogan.

"The arresting officer said he got it from an assistant district attorney, and that's all he knew. He said he'd had other reliable tips from the same man, so he set up the trap that picked up Benny. Well, I demanded to examine the assistant district attorney, a young fellow named Ron Kane, graduate of University of Ari-

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zona Law School four years ago. I put him on the stand, and he said he got the tip from—you ready for this?—a file clerk of his named Alexis Carleton. I put *her* on the stand, and that's where everything came to a halt. She said she read Benny's mind. I didn't have time to shake her. She said she knew everything Benny knew, and she knew everything that Louisa knew. That's where we left it when court adjourned for the day."

Louisa said quietly, "Interesting. That would mean she knows everything about us that Benny knows, which could be downright inconvenient. But mind reading?"

Centerton said, "Well, I wouldn't attach too much importance to it at this stage of the game. She's concealing something. I'll get it out of her tomorrow. So we'll just have to— what's the matter with you?" This last to Dr. Roger Whiteman, who was staring at the floor with an odd intent frown on his face.

"I'm surprised to have something like this come up in a court of law," said Whiteman and he settled back and looked up. "It's been established that extrasensory perception is nonexistent, violates several fundamental laws. There's been a fair amount of effort in the field, particularly in England and in North Carolina. Some of it has been shown to be well intentioned trickery. But I can't accept that this female file clerk is an— I believe they call them espers. We have to look elsewhere, I think."

Centerton said, "Didn't one of your colleagues say something like, 'Whenever all the improbables have been eliminated whatever is left, however impossible, must be the answer?' "

"Something like that. But it's easier to believe they have some kind of a gadget to listen than to believe there's such a thing as an esper."

Louisa gave a low whistle. "Think of the trouble I'm in if they really have an esper. Do they know what we're saying right now?"

They looked at each other quickly, but then Centerton said, "Oh, come on now. We're letting our imaginations run away with us. We don't really have any information yet. Wait until it's all in."

When Centerton got off the elevator at the third floor of the courthouse the next morning, he found the corridor jammed with noisy people. He said to a guard, "What's going on?"

"Good morning, Mr. Centerton. They heard about this mind reader you got in your case here."

Incredulous, Centerton turned to look at the crowd. He recognized several reporters from the big dailies, and he recognized large numbers of the type of people who flock to an unusual trial because they have nothing better to do. Among the crowd, though, he saw a half dozen of a different kind of person, quiet, smoking pipes, wearing jackets that did not match their trousers. In a moment he had them placed—pro-

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fessors, teachers, something like that. He shook his head and went on in.

Miss Alexis Carleton was recalled to the stand, reminded that she was still under oath, and turned over to Centerton. He leaned back in his chair and opened his mouth to speak, when she said, "Are you going to keep on telling us this nonsense about mind reading?"

Centerton closed his mouth and stared at her. Judge Carter, who had been bent over some papers, looked up from one to the other and said, "What was that?"

Alexis Carleton said to him, "I merely read the lawyer's mind and stated his question before he asked it. Isn't that right, sir?" This last to Centerton, then she said, "The answer is, 'yes'."

Laughter rang through the courtroom, and the judge tapped his gavel and said to Alexis Carleton, "No more of that, please. A witness is required simply to answer the questions put to her. Proceed."

Centerton was shocked because, in fact, the question was exactly what he had planned to ask. He decided to change his tactics quickly to see if he could find out what was happening. He asked, "How do you do it?"

"I don't know."

To give himself time to think, Centerton got slowly to his feet and walked toward the witness, a line of questioning taking shape in his mind. He would ask for a history of her mind-reading activities and try to make her prove her ESP powers.

She nodded to him as he drew close and said, "That's a good way."

Centerton stopped and stared at her, and the judge said, "Now, young lady, I have told you . . ."

"Your Honor," she said, "the problem here is belief. Mr. Centerton simply does not believe that I have ESP, and if I can prove to him I have, it will simplify things all around. You see, Your Honor, his real client, Mr. Louisa, is very, very anxious to find out just how the police got hold of such confidential information, and if I can make Mr. Centerton believe I'm an esper, we can all get down to business sooner."

The judge looked at Centerton, expecting him to enter an objection to her comments, but Centerton said, "I'll resume my questioning in a moment, Your Honor." Slowly he went back to his seat, greatly discomfited now. The witness had twice said exactly what was on his mind, and had also named in open court his principal client. Coincidence might explain how she had hit upon what was in his mind, and the district attorney might have told her who his client was; he had made no great effort to hide him. He sat down and looked at her. He saw a slim girl with a high chest, a well-scrubbed face and a turned up nose. Her gleaming brown hair hung almost to her waist, and she had good legs. She was a very pretty girl, and her brown eyes crackled with intelligence. Looking at her now, Centerton deliberately formed in the front of his mind the

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words, "*All right, Miss Carleton. Go ahead.*"

Immediately she turned to the judge and said, "Your Honor, Mr. Centerton has just mentally instructed me to go ahead. He had previously decided in his own mind to ask me about my past mind-reading activities. So with your permission, I will now do so."

The judge, a frown on his face, said to Centerton, "Is that right, Mr. Centerton?"

In the silence of the taut courtroom Centerton said softly but clearly, "Yes, Your Honor."

Two newspapermen got up quietly from the audience and tiptoed to the door and out. A TV newsman followed, and then a radio reporter left.

The judge said, "You may proceed, Miss Carleton."

"Well, I was about twelve years old before I realized that these images in my mind were really the thoughts of people around me. It wasn't until then that they sharpened, anyway, enough for me to recognize them for what they were. They grew stronger and clearer as I grew older. I didn't tell anybody about it because I knew it was unusual. It didn't bother me because I quickly learned to pay attention or not whatever I wanted. Well, at college I had a professor of psychology who was interested in extrasensory perception. I read his mind and learned it was a true scientific interest. He didn't want to exploit it or anything. So I told him I was an esper, and quickly proved it. We explored it together. After college I decided the most useful thing I could do was help fight crime. So I came to New York and got a job in the district attorney's office, and proved to Mr. Kane there"—she nodded toward the assistant district attorney—"that I could read minds. He decided to rely on some of the things I learned. That's all there is to it."

There was a jet-black silence in the courtroom as Alexis Carleton looked around.

Centerton said, "Do you . . . ?"

". . . Ever make mistakes?" she finished for him. "Not mistakes as such. Sometimes a particular mind is unclear at the moment. Sometimes I haven't the . . . haven't the strength to bring thoughts under my control." Centerton noted the odd hesitation, wondered what it meant, resolved to explore it and saw the smile appear on her face. With a shock he realized he had not the slightest element of surprise in his examination; she knew everything that swept through his mind. He knew he had to get out of there and reflect on what to do. But he had a question, and again he put it mentally, "*How accurate are you?*"

"About eighty-five percent. This means that about fifteen percent of the time I can't make a clear reading. But when I can, I'm one hundred percent accurate, as you have seen this afternoon."

Centerton sat back and tried to

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think. After about five seconds of silence the judge said, "Mr. Centerton, are you satisfied the witness speaks the truth and can read minds? If so, I'll overrule your motion to dismiss the indictment."

Almost, Centerton made the mistake of requesting postponement without saying why. But he realized that Alexis Carleton would tell the district attorney what he was thinking, so he might as well tell the court. He said, "Your Honor, my motion to dismiss may still have merit, but I must have time to consider the possibilities. For example, this telepathy may be in the nature of an illegally obtained confession, or it may be in the nature of an illegal wiretap. It may constitute a civil invasion of privacy sufficient to taint all evidence obtained as a result of that invasion. I need time to consider these things, so I ask we adjourn until Monday morning at which time I will present my arguments, if any, on these points."

The judge said, "Court adjourned until ten o'clock Monday morning." When he got up, the spectators exploded out the doors, Centerton among them.

Centerton got his group together quickly, hustled them into a taxi, and held his meeting in one of the old, genteel, men's clubs down near the Battery. He hoped that the range was too great for Alexis Carleton.

"Look," said Centerton to Dr. Whiteman, "I am telling you. She really is a clairvoyant. I put her to the test half a dozen times and she never missed."

Dr. Whitemen shook his head, smiling slightly, and said, "No, my dear Mr. Centerton. It is impossible. There is simply no such thing as a clairvoyant. This has been thoroughly established. In fact, in preparation for this meeting I have asked some of my associates to pull together the literature demonstrating the nonexistence of ESP." He opened a thick, brown folder filled with reprints and copies of journal articles. "My associates were as disturbed as I was to think we might be hoodwinked into thinking that ESP is a fact. And in a case that seems to be fast becoming notorious. I simply cannot . . ."

"Dr. Whiteman," said Centerton, staring straight at him, "I don't seem to be getting through to you. I was there. I am a reasonably intelligent man. I knew what I was doing. No one could have hit by chance on what was in my mind, yet that girl used the words in my mind before I got them out. Not once, but many times."

"There has to be an explanation other than clairvoyance."

"Then you are suggesting that we simply take the position that ESP does not exist, that this testimony somehow is a fake, and persuade the judge to throw out the testimony?"

"We have no other choice."

Now Centerton smiled slightly. He said softly, "Dr. Whiteman, you have

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not thought this through. If we do what you say, that girl will be free to go back to the district attorney's office and call all the shots she wants. From now on the police will use her to pry into people's minds, and we can do nothing about it because we took the position that it was all a fake. Benny Luger will get convicted. The police just happened to know in advance what he was going to do. From now on it will be like that. Is that what you want?"

Louisa gave one of his low whistles. "I thought we were trapping the police with this setup. It begins to look like we're the ones who've been trapped."

Hogan said to Centerton, "What do you think we should do?"

"I think we have to accept the fact of ESP and fight it as being unconstitutional. That's the only legal way we're going to get Benny off and the only legal way to prevent this situation from arising in the future. We have to accept it, and beat it."

"I can't agree," said Dr. Whiteman. "This is a scientific travesty, and neither I nor any bona fide scientist could accept such a proposition."

"Well," said Centerton, turning to Louisa, "you're paying for all this. It's your decision. Which way do we go?"

Louisa said, "Let me see if I understand you. If we succeed in proving ESP is hogwash, that girl simply continues to tip off the police from now on. The cops will show up at critical times and they will simply say that they are following these stupid hunches this girl has, and that ends it. Right so far?"

Centerton nodded.

"But, if we accept the fact of ESP, then we can try to get it outlawed so the police cannot legally rely on it. Is that it?"

Centerton nodded.

"Then there's no doubt of what we have to do. We have to accept it, and make it illegal, not only to get Benny Luger off, but to safeguard all our future operations."

Centerton said, "I'd better make my position clear to you. I personally hope all your 'future operations' cave in tomorrow. I think you are a parasite on society and should be behind bars. But you are entitled to be treated legally by the very society you prey on; that's a lawyer's job. You understand me?"

"Very clearly, and I still say, let's tackle this one."

"All right," said Centerton. "We have some law to try to make."

Dr. Whiteman said, "Gentlemen, if you do that, you must do it without me. Neither I nor any reputable scientists could go along with this travesty on science. Do you realize what you are doing? You are making the courts approve a pseudoscience—a fake. Damage to the confidence of the people in science will be immeasurable. No, you must choose: are you for science or against it?"

"Look," said Louisa, "we may need you. Can't you work with us on

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this? As a consultant? The money will be very, very good. Just give us the benefit . . ."

Dr. Whiteman stood up and said, "I'm sorry. No. I cannot work with you, and if you persist in this course, I must work against you. So make your choice."

Louisa said, shaking his head, "Boy, I don't have many friends around here, but . . ." He got up, extended his hand to Dr. Whiteman and said, "So long, Doctor. See you around."

Dr. Whiteman stalked from the room.

"All right," said Centerton, getting up. "We will accept ESP as a fact of life, and fight it. I've got a week's work to do over the weekend. Hogan and I are going to the office and put the staff to work. I'll be in touch with you Monday after court, Mr. Louisa. Don't bother me in the meantime."

When Centerton stepped out of the elevator Monday morning, he was almost driven back in by the crowd. It took him five minutes to work his way twenty feet to the door of the courtroom. Inside, he and his associates took their seats at their table and spread out their notes. When the gavel rapped to open the hearing, the judge said, "Mr. Centerton, have you decided on your position?"

"Yes, Your Honor. We accept the fact of the existence of ESP in the witness Alexis Carleton, and I would now like to present my arguments as to why any evidence obtained by ESP is inadmissible."

Several things happened at once. The judge opened his mouth to speak, the assistant district attorney got to his feet, two men walked through the gate in the bar to the floor of the court, and two more headed down the aisle toward the gate.

The judge's gavel brought everything to a standstill, and the assistant district attorney said, "Your Honor, over the weekend, two *amicus curiae* briefs have been offered, and the People of the State of New York have no objection to them. Accordingly, I present attorneys for the National Academy of Science and for the American Academy of Arts and Science." He waved at the two attorneys and sat down.

The judge said, "Just what interest do these two august bodies have in this case of the People versus Benny Luger? Furthermore, under the requirements of the doctrine of Northern Securities Company v. U. S., you two will have to show me how you can be interested in any other case before you can be allowed to appear as *amicus* in this one."

"Easily done, Your Honor," said the attorney for the National Academy of Science. "You are about to decide as a fact whether or not ESP actually exists as a present reality. This is an absurd question but it is a finding of a scientific fact, one that has been under scrutiny for many, many years. The National

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Academy of Science can act as a true friend of the court in this matter in deciding on this scientific fact."

The other attorney spoke up. "The same goes for my client, Your Honor. The American Academy of Arts and Science can offer incontrovertible proof that ESP cannot exist. It is in a class with the perpetual motion machine. To prevent this travesty on science from being used in this or any future case, we ask permission to appear *amicus curiae*."

"Your Honor," it was the third attorney, "my client is the National Science Foundation, and for the same reasons we also wish to appear *amicus*." And the fourth attorney echoed the words on behalf of the National Association for the Advancement of Science, throwing in the fact that his Association had already explored this controversy in its journal *Science*.

The judge looked at the group of attorneys quizzically and said, "I gather that you gentlemen feel the determination of this fact is too important to be left to the judgment of a mere court."

"Oh no. Not that, Your Honor. We wish only to be of assistance. Heavens no, Your Honor."

The judge said to Centerton, "Do you object to all these *amicuses*?"

Centerton had to do some fast thinking. In the time it took him to get up slowly to his feet he had the answer. "Your Honor, we do not object. But I think it is time that our learned scientific societies be introduced to the fact-finding processes of our judicial system. I ask permission for all the lawyers to hold a conference with you at the bench right now, including the reporter."

The judge said, "Permission granted."

The other lawyers looked at each other, and then began to drift forward. It made quite a crowd around the bench.

Centerton said softly, "I suggest that you, Your Honor, call in the witness Alexis Carleton, and then *think* a set of directions at her to see if she can read your mind and carry them out. The reporter will have written down the directions in advance so we will all know what they are. Won't that be an adequate demonstration of ESP sufficient for a finding of fact?"

The judge did not hesitate. "I like it. You object, Mr. Kane?"

The district attorney answered, "I like it, Your Honor."

The four attorneys for the scientific societies began to protest, but the judge quieted them and said, "I want Miss Carleton to enter the courtroom, and this is what I will *think* at her. Walk halfway toward Mr. Centerton's table, stop, walk to the clerk and take up the Bible, hand Bible to Mr. Centerton, sit down briefly in the witness chair, take Bible back from Mr. Centerton and hand it to Mr. Kane, approach the bench, then return the Bible to the

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clerk, and sit down in the witness chair. If she does all that on my simply *thinking* the directions at her, I will most certainly be convinced she reads minds. Won't all of you?"

The NSF lawyer said, "Ah, I'd like permission to consult my client first."

"Consult later," said the judge. "Tell you what you do. You four make a list of these things I've outlined in any order you want. I'll think them that way. Go to it."

The lawyers hesitated, but Centerton began to make a list on his pad, and the rest gathered around and then began to make suggestions. In a few minutes, they had the list.

The judge tapped his gavel for quiet and said, "I want absolute quiet in the courtroom. I direct the reporter to record the physical movement of the next witness from the moment she enters the courtoom until she leaves. Is that clear?" The reporter nodded, and the judge said, "All right. Will the clerk please call Miss Carleton?"

Alexis Carleton entered through a side door, and the things that happened next were exceedingly undramatic. As she stepped in the door, she first looked at Mr. Kane and then quickly turned to face the judge. The judge simply stared at her, glancing down now and then at the piece of paper in front of him. She began wandering around the courtroom, doing silly things, with no logical order in any of them, seeming to change her mind with great frequency as she walked here and then there, and picked up things and carried them around the room. In two minutes she was done and she walked out of the courtroom through the same door, leaving a deathlike silence behind her, and a group of lawyers staring at one another. Her performance was exactly as written, and every lawyer there knew that she had clearly and accurately read the judge's mind.

The judge said, "Well, I find as a fact that this witness, Alexis Carleton, has the ability to read minds. As the record will show, she is obviously possessed of the ability sometimes known as ESP. Therefore her testimony in the case of the People v. Benny Luger will be admitted. Now, Mr. Centerton, I believe you had some arguments as to the illegality of ESP once it has been established that it exists. Are you ready to present arguments why evidence obtained by using ESP is tainted evidence?"

"I'm ready."

"Just a moment, Your Honor." It was the lawyer for the National Academy of Sciences. "My client tells me that the test we have just seen is unscientific, unreliable, illogical, emotional and totally devoid of merit. We wish to note an objection. On appeal we will—"

"I give you permission to file whatever briefs you wish. Your objection is noted. Proceed, Mr. Centerton."

Centerton spoke eloquently for an

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hour and a half. He drew a skillful analogy between mind reading and illegal wiretaps, citing cases. He then went on to the tort of invasion of privacy, blending it in with the criminal law, citing cases. He drew an analogy between mind reading and an illegal search, citing cases. He ran in Lady Godiva and the Peeping Tom class of crimes, citing cases. All in all he did a magnificent job of showing why any evidence obtained by clairvoyance was tainted evidence within the purvue of constitutional guarantees. He sat down in a hushed and respectful courtroom.

The judge sighed and said, "My compliments on a well-reasoned argument, Mr. Centerton. However " As soon as he heard that "however" Centerton knew he had lost the argument. The judge went on. " In my opinion, the gift, or ability, or whatever you call it of ESP is simply another human sense like sight, or hearing, or smell, or touch. A person who has it has a perfect right to use it in any manner normal to the possession of the ability. Do we tell a person with eyes not to see? One with ears not to listen? When one sees, or hears, or otherwise detects with his senses something that affects our society, is he required to ignore it? I think not. It is important to note in this case that the faculty used for detection was a *human* faculty, one that did not require wiretaps, radio microphones, amplifiers, telescopes, or in fact any electrical or optical device of any kind whatsoever. Technology had nothing to do with it."

The judge looked down for a moment, and when he looked up again he spoke more softly. "One more point. I do not believe in miracles, and I have reflected on the things we were told concerning the early childhood of our clairvoyant witness. I rather suspect that this clairvoyance is more common than its possessors now acknowledge, in which case I want to take this opportunity to tell all espers to come forward. Society needs them now, perhaps more than ever before. We need them to help control the wolves among us. We need them to help us penetrate the facade of respectability and righteousness that the lawless erect. New barriers call for new alliances, and I think we have one in the making here.

"And so, Mr. Centerton, your motion to dismiss is denied. Evidence obtained by ESP is constitutional. Benny Luger must go to trial." ■

THE ANALYTICAL LABORATORY/JULY 1971

PLACE	TITLE	AUTHOR	POINTS
1.	The Outposter (Conclusion)	*Gordon R. Dickson*	2.00
2.	Zero Sum	*Joseph R. Martino*	2.10
3	A Little Edge	*S. Kye Boult*	3.18
4	Poltergeist	*James H. Schmitz*	3.70
5.	The Man With the Anteater	*F. Paul Wilson*	3.91

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THE BEST SF SHORT STORIES

Last January I told you, here, that Michael Shoemaker of the Washington Science Fiction Association had stuck his neck out further than I ever intended to do, and volunteered to handle the very considerable work involved in a "best short science fiction" poll. A number of things, including his moving, delayed a report on the results until now. In what follows, I'll try to make clear what is his reaction and what is mine.

Only 108 of you sent Mike lists of your favorite stories and there were only 33 lists of "oldies but goodies"—but more of that later. Even with this small return—not really bad, but not a rousing turnout—you nominated 1,680 different stories and series of stories by no fewer than 351 different authors as among the best science fiction of all time. Did you realize that there were that many SF authors, let alone that many who had written outstanding stories?

Mike Shoemaker comments that older fans are not well represented, and younger fans have not read the older stories. I'll amend that: the old stories they voted for have been read in anthologies, and probably paperback anthologies. Only four of the 48 stories and series that received more than 15 votes date from the 1930s . . . and two of them are John Campbell's "Twilight" and "Who Goes There?" There are 15 from the "great" 1940s, 20 from the 1950s, and only 9 from the last decade.

One result which we both foresaw is that authors who have done a few outstanding stories will get more votes for their best work than prolific authors like Poul Anderson and Murray Leinster, who in a sense set and represent the norm in modern science fiction. Poul Anderson ranked first in number of stories considered tops—59, to Isaac Asimov's 52 and Arthur C. Clarke's 50—yet Poul didn't get a single story into the final list. Runners-up in number of stories nominated are Theodore

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The Reference Library

P. SCHUYLER MILLER

Sturgeon with 49, Robert Sheckley with 42, Robert Heinlein with 41, Ray Bradbury with 40, Eric Frank Russell with 37, Henry Kuttner, Fritz Leiber, and Murray Leinster all with 29, and Clifford Simak with 27 stories. Yet Sheckley, Bradbury and Leiber didn't get into the finals either.

The total number of votes for all the authors' stories, lumped, presents a somewhat different picture. Heinlein is 'way ahead with 348 votes, Asimov follows with 273, and Clarke has 225. Anderson has 182, Russell has 168, and Sturgeon has 154. Henry Kuttner/"Lewis Padgett" follows with 117. Harlan Ellison makes this list with 113, and Ray Bradbury has 111. Murray Leinster and "Cordwainer Smith" are tied at 108 votes. Roger Zelazny has 101, Simak has 100, and A. E. Van Vogt has 95.

We decided to let readers vote for favorite series of stories as well as for single stories, and I am going to list the results separately here. Isaac Asimov's robot stories and Zenna Henderson's stories of the "People" were 'way ahead with 46 and 43 votes respectively, and the robot stories stand second in the entire poll. Clifford Simak's "City" stories (25), Henry Kuttner/Padgett's "Gallagher" stories (23), Larry Niven's "Beowulf Shaefer" series (22), A. E. Van Vogt's "Space Beagle" stories—the original stories, beginning with "Black Destroyer," not the book—with 20 votes, James Schmitz's still going Telzey Amberdon stories (17), and Christopher Anvil's "Pandora's Planet" stories (15) complete the list of most popular series. Most of them originated here.

But I can't string this out forever, so I'll have to let the "oldies" go till next time.

According to those of you who voted, Isaac Asimov's "Nightfall" is your favorite science-fiction short story. It got 49 votes out of the 108, with the robot and "People" series following. Arthur Clarke's "The Star," Heinlein's "The Green Hills

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of Earth," and Daniel Keyes' "Flowers for Algernon" are tied at 42, and Roger Zelazny's "A Rose for Ecclesiastes" follows with 36. Now the present generation begins to creep in—but not all that fast!

Robert Shaw's "Light of Other Days" is Analog's most recent winner. It was published in 1966 and got 29 votes. Clarke's "The Nine Billion Names of God" and Harlan Ellison's " 'Repent, Harlequin,' Said the Ticktockman" are tied with 27 votes, and there is a four-way tie—Clarke's "Rescue Party," Tom Godwin's "The Cold Equations," Murray Leinster's "First Contact," and Heinlein's "By His Bootstraps"—with 26 votes.

One result that I cannot understand is the failure of Theodore Sturgeon's "Baby Is Three" to get into the list near the top. Probably the younger readers have seen only the novel of which it is a part. The vote makes Sturgeon's "Microscosmic God" his "best" story, tied at 23 votes with Kornbluth's "The Little Black Bag" and the "Gallagher" stories from Astounding's "good old days."

Asimov is back with 22 votes for "The Last Question," but he is tied with Ellison for "I Have No Mouth and I Must Scream" and with Niven's series about the future universe, "At the Core," "Flatlander," "Neutron Star" and "Grendel," with Beowulf Shaefer the unifying character. Simak's "The Big Front Yard," Clarke's "The Sentinel"—the story that grew into "2001"—and James Blish's "Surface Tension" all got 21 votes, and Jerome Bixby's "It's a Good Life" ties the "Space Beagle" stories with 20 votes—"Black Destroyer" is about halfway down the list of great old stories, and belongs higher.

John Campbell, writing as "Don A. Stuart," entered the list with 19 votes for "Twilight" and 18 for "Who Goes There?" These two stories, with Stanley Weinbaum's "Martian Odyssey"—tied with "Twilight"—and the beginning of Van Vogt's "Beagle" series—1939—are the only stories in the list published before 1940. Heinlein's "And He Built a Crooked House," Kuttner/Padgett's "Mimsy Were the Borogroves," and Zelazny's "For a Breath I Tarry" are also tied with "Twilight," and Cordwainer Smith's "Game of Rat and Dragon" with "Who Goes There?"

Heinlein has eight stories in the final list. I've listed three: next comes "The Roads Must Roll"—17 votes—tied with Eric Frank Russell's "Dear Devil" and the "Telzey" stories. Strange company! "All You Zombies" and "The Long Watch" share the 16-vote pigeonhole with H. Beam Piper's "Omnilingual," Russell's "Allamagoosa," and Cordwainer Smith's "A Planet Named Shayol."

Mike Shoemaker ended his list with the stories—six, and Anvil's series—that got 15 votes. Heinlein has two of them: "Year of the Jack-

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pot" and "The Man Who Sold the Moon." Wilmar Shiras' "In Hiding," another standout from the Astounding years, and Sturgeon's "Killdozer" are also there. So are Fredric Brown's "Arena" and Harlan Ellison's "A Boy and His Dog," the most recent story in the list.

I think that on the whole it is a good list. Mike Shoemaker comments on the fact that some of the stories that rated high in the Science Fiction Writers of America "Hall of Fame" are low or missing. He says, valiantly -even foolhardily--that the vote would be more meaningful if we had used this poll as a nominating ballot, then asked you to pick the best twenty out of the forty-eight. From where I sit, that would be sheer masochism!

Mike regrets that Astounding's "Golden Age" isn't better represented. I don't agree. Granted, this is a poll of Astounding/Analog readers but I think you have screened the past very well, without ignoring the newer writers. Next month, with the shorter old-time list, I'll have space to dispense more after-the-fact wisdom about your choices. My favorites? I didn't vote. Couldn't make up my mind

THE METHUSELAH ENZYME

By Fred Mustard Stewart • Arbor House, New York • 1970 • 244 pp. • $5.95

The author's previous book, "The Mephisto Waltz," was a weirdie about transplanted personalities which didn't quite have the force of "Rosemary's Baby," but carried enough of the same readership to sell to Hollywood. The publisher obviously hopes the new book will capture the readers of "The Andromeda Strain," and it probably has captured, or will capture, another film contract. But—and please remember that bad puns are traditional in science-fiction circles, fannish if not professional—"The Methusaleh Enzyme" doesn't really cut the mustard. It starts well, then degenerates into routine melodrama.

Three wealthy couples—a tycoon with his young wife, a broken-down actress with her young gigolo, and another millionaire with his drug-saturated son—move into a Swiss clinic whose proprietor, Dr. Mentius, promises to make them young again with his "Methusaleh Enzyme." Personal and plottish frictions develop among the younger members of the teams, who pry and probe a bit more than they should. Good science-fictional mysteries gradually unravel and are solved only to uncover new problems. What really happened to the three younger partners during their prolonged physical checkup? Why is the maid pregnant? (The author can't possibly have read "But Jack Barron" before he plotted his book.)

Then the whole thing goes formula—fine for a film, maybe (tonight's restaurant eavesdropping produced a woman complaining "They act as if the audience were stupid"), but not for serious science

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fiction. What Bob Silverberg could have done—and would have done—with a book like this!

TACTICS OF MISTAKE

By Gordon R. Dickson • Doubleday & Co., Garden City, N.Y. • 1971. • 240 pp. • $4.95

This book was serialized here in Analog at the end of last year. I haven't compared the two versions, but it's a long and detailed book, and I imagine the serial was shorter. Details are one of the things you savor in Gordon Dickson's books, so you haven't really read it.

It is also very early in the cycle of books and stories that the author is writing about the Dorsai, that planet of people who are bred, live and die as the toughest, most expert mercenary soldiers mankind has ever seen. In fact, this is the book in which we learn how the Dorsai pattern was formed and the Dorsai race started on its straight and narrow course of purposeful evolution.

If you didn't read the serial, the book begins at a time when men have been out among the stars long enough to start crystallizing aberrant societies and sub-races. Back here on conservative old Earth the Cold War, or something very like it, is still controlling the motives and movements of nations and worlds. The Coalition, which just may be Russian/Chinese at core, has its group of client worlds and states. The Alliance, which may be NATO in origin, has its clients. Then Lieutenant Colonel Cletus Grahame, an Alliance tactician, decides to take a hand, and to test what he calls the "tactics of mistake." Negatively, his purpose is to force the Coalition Secretary, Dow De Castries, to overreach and destroy himself. Positively, he intends to create a "tradition to come"—the tradition around which the Dorsai world and people will eventually be shaped.

Cletus Grahame is by no means a stock hero. He wins and wins and wins, and he is by no means modest about it, because he is housebreaking men and governments by rubbing their noses in the messes they make. He is ruthless because he is pragmatic, and he comes close enough to being a thorough bastard in the process. Even so, and perhaps because he is so close to an automaton in working out his plans, the book never really captures the reader emotionally as so many of the author's other stories in and out of this series, such as "Call Him Lord" or the recent "Jean Duprès," have done.

In their day, Isaac Asimov's future of the Foundations and Robert Heinlein's of the "Future History" seemed impressively complex and real. Quietly, Gordon Dickson has been building a future of his own that is far more logical, more humanly real, and with a stronger philosophical foundation than either of those classics. The whole is going to be a good deal more than the sum of its parts.

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BRASS TACKS

Dear Mr Campbell.

In Analog of April 1971 you discuss thermal pollution. You suggest it can be tolerated because one benefits more from his local power station than he suffers from the deleterious effects of thermal pollution. After all the ecology of the stream, lake or coastal water is not being destroyed but rather being replaced by another equilibrium of ecology.

The point I would like to make is that there is no need to be passive about the subject, if one is enterprising enough he can actually cultivate an ecology.

At the turn of the century the oyster was a multi-million dollar industry for Long Island (New York). Because of over mining by oyster companies and also the work of Mother Nature and her starfish, the profit from oystering has dropped over an order of magnitude. Three or four years ago, seven waning oyster companies decided to buy the warm (90°F) out wash from the Northport Power Station. Utilizing this warm water, algae enrichment techniques and breeding methods, the companies can raise a mature oyster in 2½ years (instead of 4). They can also produce oysters in greater quantity than Mother Nature ever could. The results of the project over the short run have been very favorable—perhaps once again the Long Island oyster can achieve the prominence it once possessed.

Related companies should take advantage of the untapped water from the power stations. The temperature of the water can be controlled by regulating the volume of water used to cool the plant. Also a series of water fountains are very effective in cooling water and also can add much to beautify the station.

Still during the winter months, however, a number of fish turn up floating on L.I. Sound. The fishing companies, though, have a "field day". They sell the fish (the fish are killed because of the sudden exposure to cold water and not to any poison—the water comes out of the station cleaner than it went in.) As a result the fishing companies profit from the increased winter catch, and locally the individual consumer ben-

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efits from the lower fish prices.

Thus thermal pollution does not have to merely be tolerated when it can be used to benefit. Notice that it is free enterprise that can cope effectively with thermal pollution and not government intervention which ecologists (liberal) demand.

MARTIN ROMEO '73
M.I.T.
MacGregor House H324
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Cambridge, Massachusetts 02139

An ecology can use most pollutants—if applied with a little judgment!

Dear Mr. Campbell:

With respect to your "This Is English" section of the May issue of Analog, the answer is that this is not English, but, in fact, is an example of the increasingly common language, "IBMese" which is becoming increasingly common. While the quote that you gave would seem relatively meaningless to those who had not been exposed to the meaning of some of the terms, the "IBM System/360 Operating System PL/I Reference Manual", from which that particular quotation came, is relatively clear as compared with manuals such as "IBM System/360 Operating System Supervisor and Data Management Services," from which the following lines are obtained:

"There is a pair of entries (normal/overflow pair) in the track index for each prime data truck in the cylinder; one entry contains the home address of the track and the other contains the key of the highest record on or associated with that track. If all the tracks allocated for the prime data area are not used, their entries in the index are 'flagged' as inactive. The last entry of each track index is a dummy entry indicating the end of the index. When fixed-length record format has been specified, the remainder of the last track used for a track index contains prime data records if there is room for them."

BENJAMIN M. YALOW
Columbia Computer Center
Columbia University
New York, N. Y. 10027

"IBMese" is a local dialect of the widely used language Technicalese—a language using English words and English grammar, but the words only appear to be English, since they have esoteric new definitions. In Chemical Engineering Technicalese, for instance, a "cyclone" is not a violent wind storm.

Dear Mr. Campbell:

With respect to the "This is English?" feature on page 51 of the May issue, perhaps you will allow me to point out that many technical passages are unclear when taken out of context. Mr. Karpinski has omitted the first 197 pages of IBM's Language Reference Manual for PL/1 (the passage quoted starts on the bottom of the second column on page 198 of the second edition of the manual) which explain each word in this passage in great detail. "Con-

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trolled variable", "allocation", "attaching", "task" are all defined words. Anyone with a modicum of intelligence would have little difficulty with the extracted section if the earlier parts of the manual had been read

To answer your question: yes, this section is English—perfectly good technical English.

CARYL MCALLISTER
3935 Duncan Place
Palo Alto, California 94306

The fun is where you do take it out of context. And it is not English—it's Technicalese, a new language in its own right; it just sounds like English.

In English a "gift" is a donation; the word looks and sounds like the same in German—but there it means "poison"!

Dear Mr. Campbell:

Stanley Schmidt's story, "The Unreachable Stars," in your March 1971 issue interestingly coincided with Lawrence Lessing's article, "The Senseless War on Science," in the March 1971 issue of *Fortune* magazine. The underlying thesis of both the story and article are dangerously similar. I have been an avid reader of science fiction since I was nine—over twenty-five years ago—but have rarely read a story where I was so convinced that the fiction would all too soon be fact. Several years ago I began to suspect that this country's space program was destined for almost the exact fate predicted in Schmidt's story—a few landings on the Moon and a few robot landings or fly-bys of the nearer planets. The strained and irrational assaults on science and technology summarized in Lessing's article, and particularly as they apply to our space program, are probably only the forerunners of even wider opposition to come.

In my opinion only a small part of this opposition comes from within the scientific community or the organized academic communities in the humanistic sciences and philosophies, although we hear more about it from them. I think the central problem we face is in the attitude of the majority of our people.

First, there is a curious lack of excitement over the subsequent moon landings—it did seem to briefly appear after the first landing. As Lessing states in the *Fortune* article, the landing of man on the Moon will rank in history "among the few clear, large, and positive achievements of the last decade, a great human feat that once would have swelled the lyrics of a Homer. Yet nothing is currently more disparaged or discounted, often by the most determined humanists, than the odyssey of man in space."

Second, I think the most corroding influence is the attitude of the average person towards science and technology, which can be summed up in the question: "What have you done for me lately?" Unless he can count tangible and immediate gains in his own spheres of personal comfort and enjoyment, he is quick to

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criticize the very science and technology which gives him those comforts and pleasures manifold in the not too distant future. When they eventually do come to him he seems to have forgotten from whence they came and treats the bounty as something to which he always had an inalienable right.

Third, and perhaps most insidious, is that those who shape our policies and priorities are politicians, and with few exceptions, they view their own re-election as *their* most important goal. This in turn makes them very susceptible to the "hand out" syndrome where they can be persuaded that money and priorities should be re-allocated from such "tenuous and unproductive" enterprises as space flight, or basic research in the sciences, to bigger Welfare programs, more highways, more consumer protection agencies—is the average consumer really that dumb?—, and the like. In their minds this insures more votes at election time, and they are probably right in that respect.

The problem that most people don't realize is that the "What have you done for me lately" and "Gimme, Gimme" philosophies are very shortsighted indeed. They rarely produce any lasting improvement or advance in the cause of humanity, and probably have the opposite effect. Giving more handouts to people who are capable but unwilling to fulfill productive functions—and I don't mean the aged and the infirm, nor those who are willing but unable to find work—is not going to advance the ball for anyone, but will take away from others, directly or indirectly. The same people who scream loudest for more creature comforts now fail to recognize the incredible fallout of just such comforts from the programs they are so quick to eschew.

As an example, the attainment of thermonuclear power as an almost limitless and pollutionless source of energy is not likely to occur as a result of projects by certain companies or the government directed toward development of such energy plants to replace fossil fuel energy-producing plants, but is far more likely to "just happen" as a by-product from other research in the aerospace industry or in some theoretician's concept of plasma physics. The same is so true in other areas as well. The biological revolution, in decoding the genetic life codes, is violently criticized by many as anti-humane, anti-religious or whatever, but is far more likely to produce a cure for cancer and heart disease than the more "practical" medical research directed at just those objectives.

Let us hope that Schmidt, Lessing and others who think will spread the alarm before it is too late.

PETER O. CLAUS
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Analog's audience is one group that does accept the importance of scientific work.

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It's unfortunate that only those who already appreciate the problem will read and appreciate the statement of the problem!

Dear Sir.

Having been a fan of Nicholas Van Rijn, et al, for several years I have often wondered about St. Dismas. None of the Catholics of my acquaintance could enlighten me.

Today I saw a movie called *"The Hoodlum Priest,"* about Dismas House in St. Louis and I finally found out who St. Dismas was; he was the thief on the Right.

Pretty apt patron for ol' Nick.

MARGARET S. MIDDLETON
Geography Graduate Assistant
Memphis State University
Memphis, Tenn. 38111

Wonder who the thief on the Left was? Or maybe he was apolitical . . .

SCIENCE FICTION FOUNDATION

A Science Fiction Foundation, believed to be the first of its kind in this country, has been established in association with the Department of Applied Philosophy in the Faculty of Arts at the North East London Polytechnic.

Patron is top science-fiction author Arthur C. Clarke—of "2001" fame. Science-fiction author James Blish is among the vice presidents. The Foundation's Board of Management also reflects its literary, scientific and academic associations, with a membership of twelve including publishers and writers as well as representatives of various departments within the Polytechnic. Chairman of the Board is Charles Barren, Senior Lecturer in the Department of Applied Philosophy and himself an author and science-fiction writer.

The aims of the Foundation are first, to collect together in the Polytechnic various existing bibliographies and private libraries together with, wherever possible, original manuscripts and authors' personal papers, and to make this valuable source material available to writers, students and academics. Serious studies of science fiction, selected new texts and some audio-visual material will also be collected.

It is expected that the existence of the Science Fiction Foundation will generate a variety of activities—exhibitions, seminars, visiting lectures and research projects—all of which will cut across interdisciplinary boundaries within the Polytechnic.

All the Foundation's activities will, of course, be linked as closely as possible with parallel ones on an international basis, and approaches from any interested quarters, at home or abroad, will be warmly welcomed.

GEORGE HAY
Environmental Consortium
27 Nassau Street
London W1N 8EQ, U.K.

Looks like even a very conservative Establishment is catching on that science fiction is a long way from nonsense!

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ANTIPOLLUTION DEVICE

continued from page 7

oxidizers, and those catalytic devices have to be replaced—at a cost of several hundred dollars—because they become "poisoned" by various chemicals inhaled with the air or present as trace impurities in the fuel.

Turbine engines have been developed for automotive use; these, because they can burn their fuel in an excess of air, and burn it instead of exploding it, can have very much lower inherent pollution. Large ones using large air bypass ratios, as in modern aircraft jet engines, can nearly eliminate dangerous pollution *inherently*, not as tacked-on patches to make up for intrinsic faults. The black trail of a jet taking off represents nearly zero pollution—that's a couple of teaspoons of nearly pure carbon; it happens to be intensely black and exceedingly conspicuous, but it's completely nontoxic. Carbon monoxide—which is what makes automobile exhaust such an effective method of suicide—is tasteless, odorless, colorless, inconspicuous. That, not harmless soot, is real pollution.

However, turbine engines for cars do not look promising; the extremely high temperatures, and enormous mechanical forces to which the turbine blades have to be exposed require the use of "super alloys"—the very expensive, high nickel, high chromium, tungsten, columbium, et cetera, alloys that can stand up to temperatures above 2,000° F. in an oxidizing atmosphere and still resist the violent mechanical forces of centrifugal force, high-velocity gas streams and erosion.

Heavy trucks and buses could afford such engines in the 400- to 800-horsepower class; diesel locomotives could be replaced by 4,000 horsepower turbine engines, and the operation would be economically sound. A $10,000 engine in a heavy-duty long-haul truck is quite acceptable, since turbine engines once properly built keep functioning with very low maintenance costs for a very long time. (Just because the truck wears out after 500,000 miles doesn't mean the engine's used up—move it to a new truck chassis.)

But turbine engines for ordinary cars aren't practical.

Sure—they may be in the future. And also, in the future we'll have a decent energy storage cell. The point is we don't have them now, and we do need relief from IC engine pollution now.

Now let's look at the actual characteristics of electric cars we could build *now*, and see whether they would, in fact, be usable.

First, the only major limitations on them is the 75-100 mile range, the 60 or so mph speed limitation and the low acceleration—the last two due to the low horsepower motors we have to use because of limited

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battery capacity. The real limitation is only one: limited energy storage—the available batteries "ain't got what it takes."

Way back around 1907 the world's automobile speed record of 107 mph was held by an electric car; it was a great sprinter, but definitely no distance runner! (The next big boost in speed was made by a Stanley Steamer, incidentally, not an IC engined car.) There's certainly no inherent limitation on the speed of electric propulsion!

So a modern electric could move at speeds markedly higher than you can use in either urban or suburban areas generally; 15 to 55 mph is the range of speeds practical in such areas. Well within modern electric-car capabilities.

An electric could actually have about as great a range in in-city driving as a modern IC car; the IC engine continues sucking gas while it stands motionless in traffic; electrics don't. And an electric can be designed for regenerative braking—it can pump juice back into the batteries when it slows down for the traffic light ahead. The IC car simply heats up the brake bands when it slows down, and burns more gas getting rolling again. Electrics would make great city taxicabs.

For suburban housewives, the electrics would be great, too. Small, easily manipulated and parked, with more than enough daily range for all her shopping and social calls, quiet and vibrationless . . .

The one thing they would *not* be good for would be interurban and interstate trips involving trips of greater than 100 miles one way. "Presently available batteries" effectively means the lead-acid cell; the nickel-cadmium batteries have marked advantages, and one enormous disadvantage. The batteries in the M.I.T. electric car that competed in the transcontinental electric car race—which it lost—represented about $30,000 worth of nickel cadmium cells. The Cal Tech car, powered with a modified lead-acid battery, won. For urban-suburban car use, $30,000 batteries are not practical. The even hotter silver-zinc batteries are also even more expensive. The Ford Motor Company's entirely new sodium-sulfur battery is electrically superior to the Ni-Cd or Ag-Zn batteries—but it's still strictly laboratory stuff.

The great problem with the lead-acid cells is that you can't charge them in fifteen or twenty minutes; it takes hours. Oh, you can give a lead-acid battery a sort of hot-shot boost once in a while using a twenty-minute charge, but that neither fully charges the battery, nor improves the cell's health any.

That, I think, fairly states the case for the electrics we could build right now.

But you couldn't buy one anywhere in the country today; no market means no production. No production means no familiarity with them, and hence no demand for

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them, and that means no production because . . .

Makes a nice, tight closed-circuit doesn't it?

Now we might imagine Congress passing a tax law that imposed an unnecessary horsepower tax on all IC-engined cars. Say an annual licensing tax of $10 per horsepower above 20 horsepower. This would mean that driving around in a super-powered 420 horsepower job would cost you $4,000 a year on horsepower taxes alone. A Volkswagen would cost you about $500 a year.

Most people would not choose to pay $4,000 a year for that—but think what a status symbol that would make it!

And think of the screams of outrage from the wheels-addicted American voter at the very idea of being forced to accept a small, light, low-performance automobile or pay that terrific soak-the-rich tax!

It's painfully obvious that that would be, politically, absolutely impossible; no such bill could possibly get through Congress or any state legislature, no matter how tax-hungry governments are! Lobbying against it would be every automobile company, automobile club, gasoline company, and every individual car owner, too!

Of course, if you *could* get it through, the air in our cities would improve rapidly and immensely. And there would, then, be a market for a small, light, low-performance untaxed electric car. Available IC engined cars would also be small, light, and low-powered.

Let's consider a different and politically more workable approach. An approach I urgently recommend to the consideration of ardent ecology buffs currently engaged in hysterical campaigns against the wrong targets; this target—automobile pollution—is a real one, and the biggest of them all!

Let's pass a bill requiring that all automobile manufacturers produce cars with exhaust treatment devices that give a low, safe level of those deadly pollutants—i.e., cars that are really low-pollution machines. And add one feature not in any present bills of that nature; that the manufacturer be *responsible for keeping the pollution level of his machines low.*

What good is a low-pollution device that functions O.K. when it's sold . . . and quits three weeks later?

This proposition *is* politically salable. It happens to be unreasonable, unworkable, and impossible of fulfillment, but it's, nevertheless, politically readily salable.

The campaign would be on the basis of making those big, uncaring corporations make *good* machines—make 'em do their job right, and sell the common man a machine that not only works right when he buys it, but keeps on working right. The Big Companies, not the poor individual man, should be responsible for all

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that's real garbage! Make 'em clean it up, and then make 'em do it right so it stays working.

State inspectors would check on automobile exhaust emissions, and if a car failed the test, the manufacturer would be required to service and repair the emission control device at his expense in his shops. Make 'em build 'em so they worked, by God!

The Big Three companies are always a ripe target for any political demagogic: the idea of making the manufacturer responsible for the maintenance of his car would be popular with everyone. Of course it should be perfectly possible to get such a bill through on a wave of public enthusiasm.

Of course the fact that no auto service knows how to patch up gadgets is inconsequential. Impossible wouldn't stop any special politician, nor would it phase the public. I believe it was another bit of subconscious to accept their responsibility that made the car manufacturers scream it couldn't be done.

But it would bring out one necessary fact clearly: *it can't be done* with any kind of anything in the foreseeable future.

A temporary patch can be placed on the IC exhaust, but the only circumstances under which a manufacturer would afford to accept permanent responsibility for low-emission characteristics would be with an entirely new emitting machine. One that wouldn't produce emissions in the first place. Like an electric car.

Please recognize a basic fact of human nature: the executive management men of General Motors, or any other major car manufacturer, are *business* men. Their work is organizational, financial, and operational; the president of Corporation X may have been operating a production and sales business for twenty years in the gasoline car business, but he might just as readily be selling machine tools, computers, or yard goods. His work is business organization—not making material objects.

Such men have no inherent bias toward IC, or electric, or nuclear-powered antigravity cars; their bent is toward smoothly functioning business organization, whatever that business happens to be producing.

But the engineering staff is entirely different: they've devoted a major part of their lifetimes to the development and production of the type of engines they're dedicated to—the good, reliable, responsive IC engine. Their investment of training and experience is in that line of production. An "automotive engineer" today means an IC engine expert; he knows next to nothing about electrical engineering, motor design, and high-current electrical switching systems.

Asking the research engineers in such a laboratory to evaluate the possibilities of an electric car today will get a negative report because such men inevitably, sincerely, believe there's nothing that can chal-

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lenge the magnificent potential of the IC engine.

The management level wouldn't in the least mind switching to selling electric packages instead of gas packages; business is business.

But the engineering level most decidedly would object.

So who's going to do a good, thorough job of research and development of practical, workable urban-suburban electric cars?

The big car companies, of course. When, and only when, the situation has made it impossible for them to continue to produce the mobile smog-generators now in production. When and only when they've been made responsible for producing *permanently* nonpolluting automobiles.

And like it or not, something permanently effective *has* to be done about the automotive pollution. The best cure is not a treatment that patches it up, but a genuine *cure.* Eliminate the root cause—the IC engine.

Steam cars could do it, and so could electrics; perhaps both projects could really take off if the major companies were forced to face the fact that the IC engine cannot be made permanently nonpolluting. (A steam car, like a fossil fuel power plant, can use excess air in the combustion chamber, "slow" combustion—seconds instead of explosive milliseconds—and turn out essentially "natural exhalations" of CO_2, H_2O and very little CO or nitrogen oxides.)

But the best bet for available-in-1973 models would be an electric; the problem of recondensation of the vapor back to liquid for the steam car—whether it uses water vapor or something like Freon—remains to be licked.

Under the pressure of demand, once the electric cars were being sold by the millions, improvements in energy storage devices would come along pretty rapidly.

The efforts on fuel-cell research suggest that they won't be usable for automobiles for a long time to come, if at all. Huge power plants may use fuel cells eventually—but not small, light, mobile units. A semi-fuel-cell system using a zinc-air cell may turn out to be the answer, where replaceable zinc plates, reacting electrolytically with air, supply the power. These could be "recharged" in minutes by hauling out the old, and shoving in a new set, giving an electric with unlimited range comparable to present refillable modern gas tanks.

And *no* pollution; the "exhaust" would be solid zinc oxide, which can readily be regenerated to zinc and oxygen.

But just demand that the engineer who designed and produced the automobile *keep* it pollution-free, and see if he still insists that the pollution problem can be overcome!

That way we would get rid of the most important pollution problem our cities face.

The Editor.

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